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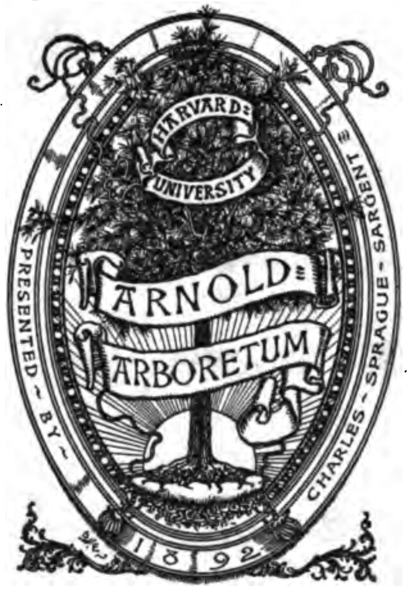
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1892

C. S. Sargent with author's best wishes
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ORCHIDACEÆ

III

ORCHIDACEÆ

ILLUSTRATIONS AND STUDIES OF THE FAMILY ORCHIDACEÆ

ISSUED FROM THE AMES BOTANICAL LABORATORY
NORTH EASTON, MASSACHUSETTS

BY

OAKES AMES
A.M., F.L.S.

Fascicle III

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To A. C. A.

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ORCHIDACEÆ

ORCHIDACEÆ

OBSERVATIONS ON THE GENUS DENDROCHILUM

IN WHICH A NEW SECTION IS PROPOSED AND FOUR NEW SPECIES ARE DESCRIBED

THE division of the genus Dendrochilum into five subgenera by Pfitzer and Kränzlin* is based primarily on peculiarities of the vegetative structure and secondarily on characters of the gynostemium and labellum. The spirit of this treatment is in full accord with the views clearly expressed by Pfitzer in his *Entwurf einer natürlichen Anordnung der Orchideen* (1887), where he says that the vegetative parts of the Orchidaceæ are the most reliable for a natural classification of the genera, and that the floral parts, being of a less stable nature, are not to be relied on to any great extent, if we except the larger divisions of the family.

A profound knowledge of the morphology of the Orchidaceæ is, of course, indispensable in all critical work tending toward a rational classification. Without it, serious blunders must of necessity creep in and vitiate results. The vegetative parts of orchids, however, are frequently the most puzzling to interpret correctly in a system of classification based in the main upon them, and have led to unfortunate errors in judgment where the genus Dendrochilum is concerned. In 1888, when Pfitzer's arrangement of orchid genera appeared in Engler and Prantl's *Die*

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* *Das Pflanzenreich*, 32 Heft (IV. 50. II. B. 7).

natürlichen Pflanzenfamilien, Dendrochilum proper (§Eudendrochilum), distinguished from Platyclinis by a lateral inflorescence and leaves duplicative in the bud, was placed in the Bolbophyllinæ, fifty-two pages distant from the Cœlogyninæ, in which Platyclinis was placed. In 1907 Pfitzer and Kränzlin, in accordance with the views of J. J. Smith, combined Dendrochilum and Platyclinis, making Platyclinis a subgenus of the former. This radical change proves conclusively that vegetative variations may arise which disturb materially a system of classification based almost exclusively upon vegetative parts. Furthermore, the results are annoying if morphological exceptions occur when vegetative characteristics are employed in casting large groups.

Notwithstanding the opinions held by Pfitzer regarding the advisableness of placing more reliance on vegetative than on floral structures in the classification and arrangement of the Orchidaceæ, the genus Dendrochilum, in my judgment, may be more naturally subdivided if the species are grouped into subgenera, or sections, according to the peculiarities of the gynostemium. This system has one difficulty, namely, the necessity of examining minute details, which may be thought too great for convenience; but as a knowledge of the species of Dendrochilum is only to be had after careful analysis of the flowers, this inconvenience is not so great as at first it may seem to be.

§Acoridium is clearly set off from §Platyclinis and §Eudendrochilum by the absence from the gynostemium of stelidia. §Eudendrochilum is distinguished from the other sections, or subgenera, by its laterally produced flower shoot (which arises from the base of a pseudobulb), although agreeing with §Platyclinis in possessing stelidia. These three sections include without undue violence to affinities all known species of Dendrochilum, if we except the Philippine species described as *D. Woodi-*

anum, a plant which has all the distinctive floral characteristics of §Acoridium and the lateral flower-shoot characteristic of §Eudendrochilum. *D. Woodianum* bears the same relationship to §Acoridium which §Eudendrochilum bears to §Platyclinis; consequently I have assigned it to a new section in the following conspectus, where it stands as a transitional section between §Acoridium and §Eudendrochilum.

CONSPECTUS SECTIONUM GENERIS DENDROCHILI

A. *Stelidia columnæ nulla*	
1. Pedunculus terminalis	**I. Acoridium**
2. Scapus lateralis	**II. Pseudacoridium**
B. *Stelidia columnæ conspicua vel rarissime rudimentaria*	
1. Scapus lateralis	**III. Eudendrochilum**
2. Pedunculus terminalis	**IV. Platyclinis**

NOTE. The stelidia of the column in §Platyclinis may be rudimentary, and either basal or terminal. In the latter case they may have the appearance of being segments of the terminal wing which surrounds the androclinium. Examples of this are to be found in *D. Mearnsii, D. bicallosum, D. Copelandii* and *D. graciliscapum,* species which approach in aspect those of §Acoridium and form, perhaps, a connecting group between §Platyclinis and §Acoridium (cf. plates 21–24, ORCHIDACEÆ, Fasc. II). *Dendrochilum* (§Acoridium) *Foxworthyi,* which resembles *D.* (§Platyclinis) *graciliscapum* Pfitz. in general aspect and is unique among the species of §Acoridium because of its simple labellum, does not possess stelidia.

In §Platyclinis there is much similarity in the floral structure of many species, which is extremely confusing and conducive to the belief that specific distinctions have been too finely drawn. As examples of this similarity, *D. uncatum* Reichb. f., *D. gracile*

Hook. f., *D. longispicatum* Ames, *D. Clemensiæ* Ames, and *D. latifolium* Lindl. may be cited. All of these species, however, differ from each other in their vegetative development and in the position of the stelidia on the gynostemium. The whole section is readily separated into three groups distinguished by having an entire, or obscurely 3-lobed, or conspicuously 3-lobed, labellum.

Dendrochilum pumilum Reichb. f. This species was originally described by H. G. Reichenbach f. in *Bonplandia* on page 222 of the third volume (1855). The description was drawn from material gathered by H. Cuming in the Philippine Islands and distributed as herbarium specimens under the number 2102. In 1861 Reichenbach, in accordance with other sweeping changes, referred *D. pumilum* to the genus Cœlogyne in Walpers's *Annales Botanices Systematicæ* (6: 236).

Until very recently nothing had been done to clear away the seemingly unavoidable obscurity under which this species has remained. In his review of the genus Dendrochilum, J. J. Smith doubtfully referred *D. pumilum* to the section Eudendrochilum.* In the Pfitzer-Kränzlin treatment of the Cœlogyninæ it is placed among the dubious species as insufficiently known. In my studies of the orchid flora of the Philippine Islands for the second fascicle of this work, I searched for specimens representative of Cuming's no. 2102, and discovered one in the herbarium of the British Museum. I have compared this specimen carefully with the description published by Reichenbach, and with specimens from the Philippines which I had provisionally determined to be *D. pumilum*. Reichenbach's description in *Bonplandia* is not all that one might desire to elucidate an am-

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*In Walpers's *Annales Botanices Systematicæ* 6: 927 Reichenbach refers this species to §Eudendrochilum. It is presumable, however, that he did so through a misinterpretation of Cuming's material.

biguous species, but taken in conjunction with the material in the herbarium of the British Museum it is reasonably serviceable. At least it is conclusive, in my opinion, in determining that Reichenbach's plant was a Dendrochilum, and to make that point sure is to advance toward a comprehension of what he described as *D. pumilum.* The semifusiform pseudobulbs, about 1 inch long, the linear-lanceolate leaves, 3 inches long, the maculate sheaths, the large floral bracts, subequalling the ovaries, the lanceolate sepals and broader cuneate-ovate petals, and the very short labellum and gynostemium, described by Reichenbach, are descriptive of the material in the British Museum, and are furthermore characteristic of a small group of Philippine species which belong to § Acoridium. These facts, taken together with the Cuming specimen and the number under which it was distributed, leave very slight doubt in my mind regarding *D. pumilum.* Reichenbach's description of the labellum is, it is true, quite inadequate, but not wholly without value when interpreted by the Cuming plant in the British Museum.

To establish absolute certainty regarding *D. pumilum,* nothing but the type specimen, which is presumably deposited in Reichenbach's sealed herbarium, will suffice; but in the absence of that, there appears to be no well founded reason for disregarding the specimens distributed by Cuming under no. 2102. It was on this evidence that I included *D. pumilum* in my list of Philippine orchids in the second fascicle of this series, and published a camera-lucida drawing of a flower taken from the specimen in the British Museum.

Dendrochilum rhombophorum (Reichb. f.) *comb. nov.* In connection with *D. pumilum,* mention should be made of *Cœlogyne* (*Pholidota*) *rhombophora,* a Philippine species described by

Reichenbach f. in *Linnæa* 41:116, which, he states, is allied with "*Cælogyne pumila* (*Dendrochilum? pumilum*)." From the description it is quite impossible to ascertain what Reichenbach's species may have been. That it includes *Dendrochilum affine*, *D. simulacrum*, *D. anfractum* or *D. cinnabarinum* is highly probable, but in the absence of types with which to make comparisons, I have deemed it best not to attempt to identify *Cælogyne rhombophora* by purely conjectural methods. Pfitzer and Kränzlin refer *C. rhombophora* to the genus Pholidota in their treatment of the Cœlogyninæ, but merely on presumption, guided by Reichenbach's suggestion. Neither author had been able to discover authentic material. It is a significant fact, however, that Reichenbach should have alluded to *Dendrochilum pumilum* as a near affinity of *Cælogyne rhombophora*. In view of the foregoing discussion regarding *D. pumilum*, I prefer to place *Cælogyne rhombophora* in the genus Dendrochilum, being fully convinced that Reichenbach's description in *Linnæa* and his reference to *Dendrochilum pumilum* warrant such a proceeding.

Dendrochilum (§Acoridium) **Foxworthyi** *sp. nov.* *Herbæ* habitu cæspitosæ. *Pseudobulbi* fusiformes, dense aggregati, graciles, 1–2 cm. longi, monophylli, *bracteis* elongatis maculatis vaginati. *Folia* lineari-oblonga, obtusa vel subacuta, apiculata, 6–14 cm. longa, 5 mm. lata, paulatim in *petiolum* gracilem angustata. *Pedunculus* gracilis, foliis æquilongus vel subbrevior. *Spica* cum pedunculo 1.5–2 dm. longa, densa. *Bracteæ* glumaceæ, ovaria superantes, 2 mm. longæ. *Sepala lateralia* oblongi-lanceolata, acuta, 3-nervia, 2 mm. longa, 1 mm. lata. *Sepalum dorsale* 3-nervium, 2 mm. longum, lateralibus angustius. *Petala* rhombico-ovata, vel obovata, acuta, 3-nervia, circa 2 mm. longa, 1.5 mm. lata. *Labellum* simplex, oblongum, apiculatum, ecallosum, ad basim cordatum vel auriculatum, 3-nervium, 1.5 mm. longum, 1 mm. latum. *Columna* minuta, columnæ *D. tenelli* similis.

PHILIPPINE ISLANDS: Epiphyte on mountain tops; flowers yellow. At 1800 m. alt. on Mt. Pinalubo, Province of Zambales, Luzon, April, 1907, *F. W. Foxworthy* (no. 2542). Specimens in herb. Bureau of Science, Manila, and in herb. Ames. COLLECTOR'S NOTE: "*The most prominent thing on top of the mountain. It covers the mossy tree trunks very densely. The leaves are a dark rather shiny green.*" (The mountain is also called *Pinalobo* and *Pinatubo.*)

The column being destitute of stelidia, this species is referred to the section Acoridium. It is clearly distinguished from all other known species of this section by its simple oblong labellum. In habit *D. Foxworthyi* resembles *D. tenuifolium,* from which species it differs in its flowers. Above, the labellum is described as ecallose. In the dried condition, at least, no calli are perceptible under the high-power lens of the dissecting microscope. If calli are present they must be extremely minute or evanescent. The graceful racemes are about 5 cm. long, bearing as many as thirty flowers, 2 mm. apart on pedicels 2 mm. long. A wide range of variation is noticeable in the material gathered by Foxworthy on Mt. Pinalubo, some of the specimens being twice as tall as others, but no corresponding variation that I have been able to discover occurs in the flowers of the extremes.

According to the classification of Dendrochilum species adopted by Pfitzer and Kränzlin in *Das Pflanzenreich, D. Foxworthyi* would seem to belong to the subgenus Aphanostelidion, which is in part characterized by the absence of stelidia from the column. It does not seem to me advisable, however, to recognize Aphanostelidion, as it necessitates confusing artificiality in the disposition of the species in the genus.* Had Pfitzer been acquainted with the numerous species which have been recently discovered in the Philippine Islands it is probable that he would

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*Cf. *Orchidaceæ,* Fasc. II. pp. vii and viii.

have refrained from establishing a subgenus which passes so easily into §Acoridium. When Pfitzer prepared his monograph, less than half a dozen species of the Acoridium section were known to him. *D. Foxworthyi* is the twenty-fourth species to be added to §Acoridium, collected for the Bureau of Science at Manila, since 1905.

Dendrochilum (§Acoridium) **cinnabarinum** Pfitzer in *Das Pflanzenreich* IV. 50. II. B. 7, *Orch.-Monandræ-Cœlogyninæ* 104 (1907); Ames ORCHIDACEÆ, Fasc. II. p. viii (1908). "Pseudobulbi anguste conico-ovati, juniores vaginis mox in fibras solutis inclusi, in rhizomate repente dense seriati, monophylli, 1 cm longi, 4 cm [*sic*] crassi. Folium in petiolum pseudobulbo duplo longiorem sensim angustatum, lineari-lanceolatum, gramineum, 12 cm longum, 5 mm latum acutum, 3-nervium, nervo medio subtus magis prominente. Scapus gracilis, erectus, hysteranthus, folium superans; racemus brevis, pluriflorus; bracteæ ovatæ, acutæ, convolutæ, scariosæ, ovarium pedicellatum superantes, bracteæ infimæ steriles erectæ. Sepalum dorsale rhombeum, subacutum; lateralia multo latiora obliqua. Petala rhombeo-orbicularia, longe acuminata. Labelli nani trilobi lobi laterales breves dentiformes antrorsum curvati, medius cuneato-obovatus, apiculatus, carinis obsoletis.—Flores cinnabarini. . . . Monsungebiet, Provinz der Philippinen: Benguet (Loher n. 461!).—Herb. Kew."—Pfitzer, *loc. cit.*

REDESCRIPTION

Pseudobulbs 1–1.3 cm. long, 3–4 mm. thick near the base, gradually tapering upwards, corrugated when dry. *Leaves* subcoriaceous; *lamina* up to 8 cm. long, 4–6 mm. wide, many-nerved, prominently 3-nerved beneath; *petiole* slender, 2–3 cm. long, 0.5 mm. in diameter, together with the pseudobulbs clothed with tubular acute or obtuse *bracts*, which, when dry, are conspicuously many-nerved. *Peduncle* wiry, shorter than the leaves or exceeding them, 1–1.5 dm. long, persistent on the mature and leafless pseudobulbs. *Raceme* erect, loosely flowered, ± 4 cm. long. *Floral bracts* 4 mm. long, cymbiform, acute, the lowermost one empty, embracing the foot of the rhachis, dilated, truncate-aristate. *Flowers* 6 mm. across, orange-red when dry, cinnabar when fresh, according to the collector's observations. *Lateral sepals* oblique, 3–3.5 mm. long, 3 mm. wide, broadly ovate, obtuse, 3-nerved. *Upper sepal* about 4 mm. long, 2.5 mm. wide, rhombic-lanceolate to ovate-lanceolate. *Petals* rhombic-cuneate, at the rounded apex acuminate or subcaudate, 2.5 mm. long, 2.75 mm. wide, 3-nerved. *Labellum* 3-lobed; *middle lobe* hastate, acute, somewhat fleshy, 2 mm. long, concave and bicallose at base; *calli* nipple-like, inflexed; *lateral lobes* diaphanous, oblong, obtuse or subacute, relatively small, 1 mm. long. *Column* typical of the section.

My description is based on a specimen in the United States National Herbarium, numbered 461, which A. Loher collected in Benguet, Luzon. This specimen is a duplicate of the one on which Pfitzer established *Dendrochilum cinnabarinum*. In Fascicle II of ORCHIDACEÆ it was stated that neither the description nor the figure published by Pfitzer and Kränzlin is reliable, both conveying an erroneous and a misleading impression. The position assigned to the species is quite anomalous and is explicable only on the assumption that Pfitzer mistook the lateral lobes of the labellum for stelidia arising from the base of the minute column. In his figure prepared to illustrate *D. cinnabarinum* the lateral lobes of the labellum are not shown, nor is the column more than vaguely indicated. The position of the species in the subgenus Platyclinis (which, according to Pfitzer and Kränzlin, is characterized in part by the presence of stelidia on the column and by the comparative size of the middle lobe and of the lateral lobes of the labellum) is therefore significant and indicates either an oversight or an absolute misinterpretation of structural details. If the conspectus of the genus Dendrochilum in the *Cœlogyninæ* is followed, *D. cinnabarinum* on every count would be placed in the subgenus Aphanostelidion and by no means in the subgenus Platyclinis. Therefore it is supposable that Pfitzer overlooked the characteristic structure of the labellum and column in the material on which he based his conception of the new species.

It is much to be regretted that error is so difficult to avoid in the study of minute flowers of complex structure, as the consequences of such error are far reaching and likely to lead to duplication of names and, in the absence of types, to constant confusion.

Dendrochilum (§Acoridium) **Loheri** *sp. nov.* Aff. *D. venustulo* sed in floribus major. *Pseudobulbi* subglobosi vel subfusiformes, juniores vaginis subacutis mox in fibras solutis inclusi, ±8 mm. longi. *Folium* lineari-oblongum, acutum, 4–6 cm. longum, 3–3.5 mm. latum, 9–11-nervium, nervo medio subtus magis prominente; *petiolus* ±1 cm. longus. *Pedunculus* folia superans vel illis æquilongus, gracilis, 4–8 cm. longus. *Inflorescentia* laxiflora. *Bracteæ* glumaceæ, ovaria superantes. *Sepala lateralia* ovato-lanceolata, uninervia, acuta, 5 mm. longa, 2.5 mm. lata. *Sepalum dorsale* lanceolatum, acutum, 1-nervium. *Petala* lanceolata, acuta, 1-nervia, 4.5 mm. longa, 1.5 mm. lata. *Labellum* 3-lobatum; *lobi laterales* ovato-falcati, obtusi, 1.5 mm. longi, 1 mm.

lati; *lobus medius* transverso-reniformis, apiculatus, circa 1.25 mm. latus; prope basim lobi utriusque lateralis et in depressione disci *callus* vel *papilla*. *Columna* sectionis.

PHILIPPINE ISLANDS: Benguet, Luzon, *A. Loher* (no. 461 A). Type specimen in U. S. National Herb.

Dendrochilum Loheri, as indicated above, is a near ally of *D. venustulum* (Ames) Pfitz. It is also closely allied with *D. strictiforme* (Ames) Pfitz., from which it is readily distinguishable by means of its very dissimilar labellum. The flowers are much larger than those of *D. venustulum* and are borne in loose racemes, and the narrow leaves and different habit are quite distinctive, while the reniform apical lobe of the labellum overlaps the lateral lobes, —a characteristic which I have not noted in *D. venustulum*. The specimens on which my description is based were collected by A. Loher. I found them mounted on the same sheet with *D. cinnabarinum* in the United States National Herbarium. I have marked the specimen on which *D. Loheri* is based no. 461 A (*D. cinnabarinum* was distributed by Loher under the number 461).

Though additional material from the Philippines may break down the distinctions between *D. venustulum* and *D. Loheri*, which I now regard as specific, the specimens thus far studied do not make such a result seem probable.

Dendrochilum (§ Acoridium) **anfractoides** *sp. nov.* Aff. *D. anfracto*. *Pseudobulbi* aggregati, subfusiformes, 2.5 cm. longi, juniores vaginis mox in fibras solutis inclusi. *Folium* oblongi-lanceolatum, acutum, 6–8 cm. longum, 8–13 mm. latum; *petiolus* 1.5 cm. longus. *Pedunculus* gracilis, erectus, folium vix superans. *Racemus* subnutans, distichus, multiflorus; *rhachis* vix flexuosa. *Bracteæ* duplo longiores quam pedicellus ovariumque, 6 mm.

longæ, 4 mm. latæ, ovatæ, obtusæ, conduplicatæ. *Sepala lateralia* lanceolata, acuta, 3-nervia, 5 mm. longa, 3 mm. lata. *Sepalum dorsale* oblongi-lanceolatum, vel oblongi-ellipticum, acutum, 3-nervium, 6 mm. longum, 2.75 mm. latum. *Petala* elliptica, vel suborbiculata, marginem versus erosula, 4.5 mm. longa, 3 mm. lata. *Labellum* 3-lobatum, 5.5 mm. latum; *lobi laterales*, 2.5 mm. longi, valde reflexi, acuti; *lobus intermedius* tridentatus, dens medius lateralibus major, 0.75 mm. longus; *calli* in basi labelli. *Columna* crassa, cucullo circa androclinium crenulato, columnæ *D. anfracti* similis.

PHILIPPINE ISLANDS: At 4000 ft. altitude, Province of Benguet, Luzon, July, 1907, *Major E. A. Mearns* (no. 4311). Type in herb. Bureau of Science, Manila.

Dendrochilum anfractoides is clearly allied to *D. anfractum* (Ames) Pfitz., as the specific name implies. It differs considerably, however, from *D. anfractum* in habit, especially in the relative length of the peduncle and leaves, and in the rhachis, which is less conspicuously zigzag. It also differs from *D. anfractum* in the labellum, which is less rounded at the base and distinctly tridentate at the apex of the middle lobe. Near the base of the labellum are two fleshy calli transversely situated, which are linear in conformation rather than papilla-like as in *D. anfractum;* between these calli in the sac or depression of the labellum are other calli or wart-like excrescences which vary in size and in number. Regarding these supernumerary calli, it must be said that they are not present in all of the flowers examined and are not of diacritical worth. The column of *D. anfractoides* is fleshy, very thick, 2.5 mm. long, with the base of the anther concealed by the crenate or crenulate terminal wing, and with the rostellar protuberance conspicuous and projecting in front.

It is unfortunate that both *D. anfractum* and *D. anfractoides*

are based on scanty material. The former species is represented by two specimens, one in the herbarium of the Bureau of Science at Manila, and the other in my own collection of Dendrochilum species. These specimens, however, are in an excellent state of preservation, and are apparently fully developed. *D. anfractoides*, on the other hand, is known only through a single plant bearing six leaves and two mature racemes. In aspect it is wholly unlike *D. anfractum*, although the floral segments, with the exception of the labellum, are similar to the floral segments of the older species. Notwithstanding the peculiarities of distribution exhibited by many orchids, which preclude large representative collections being made, the plants often occurring scattered in small colonies or as single individuals over wide areas, collectors are too frequently inclined to secure single specimens, merely as records, forgetful of the necessities of the science they are attempting to aid. Often it is not desirable to let material lie unnamed for years, in the hope that more extensive collections will throw light upon it, nor does this procedure seem necessary when the specimens are well developed and apparently normal. When, however, lack of material renders impossible a thorough study of extreme forms, errors in judgment are likely to be frequent and unavoidable. A comparison of *D. anfractoides* with *D. anfractum* may be made by means of the plate published herewith and plate 21 in the second fascicle of ORCHIDACEÆ.

Dendrochilum (§ Acoridium) **Curranii** *sp. nov.* Aff. *D. tenui*, speciei quam habitu et structura hæc species conspicue simulat. *Pseudobulbi* fusiformes, graciles, a basi fastigati, 2–2.5 cm. longi. *Folium* petiolatum, lineari-lanceolatum, obtusum, conspicue 3-nervium, 5–10.5 cm. longum, 7–12 mm. latum; *petiolus* circa 2 cm. longus. *Pedunculus* flexuosus, ±10 cm. longus, gracilis.

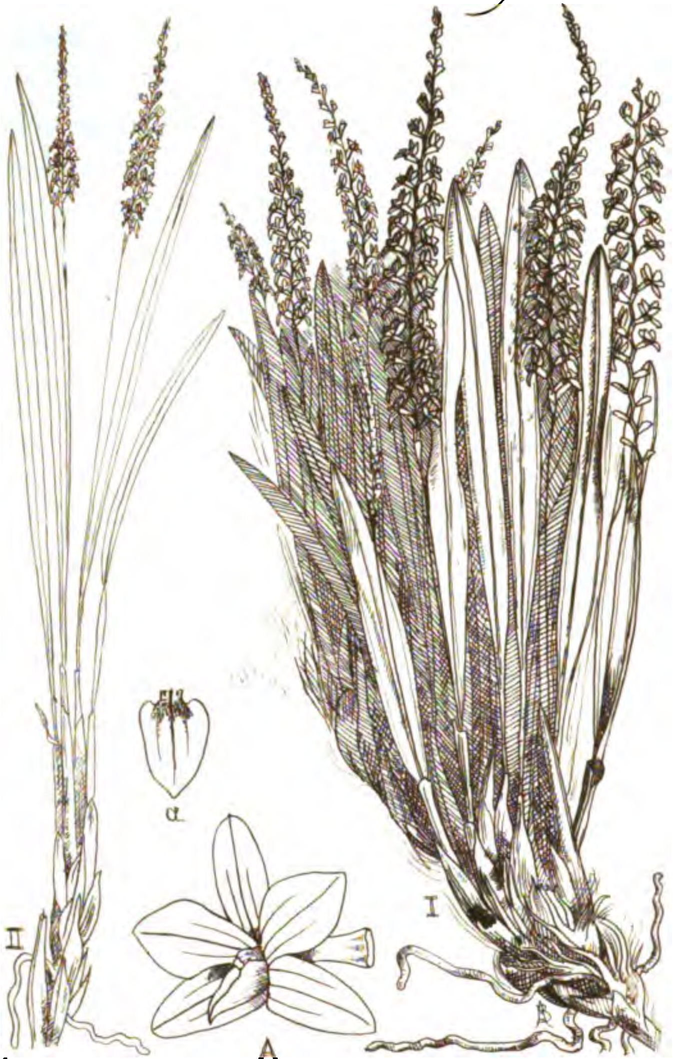
Racemus gracilis, 5–7.5 cm. longus, apicem folii superans. *Bracteæ* inflorescentiæ ±2 mm. longæ, pedicellum brevem et ovarium multo excedentes. *Sepala lateralia* lanceolata, acuminata, acuta, subcaudata vel incrassata ad apicem, 2.5 mm. longa. *Sepalum dorsale* simile, lanceolatum, acuminatum, 1-nervium. *Petala* lineari-lanceolata, acuminata, acuta, 1-nervia, 2 mm. longa. *Labellum* 3-lobatum; *lobi laterales* membranacei, semicrescentiformes, rotundati ad apicem, obtusi; *lobus medius* sagittatus, acutus, 0.75 mm. longus; *calli* 3, unus ad basim lobi lateralis utriusque, unus in medio partis saccatæ labelli. *Columna* minuta, columnæ *Dendrochili tenelli* similis.

PHILIPPINE ISLANDS: Type from Mt. Maquiling, Prov. Laguna, Luzon, January, 1908, *H. M. Curran* (no. 8077). Specimens in herb. Bureau of Science, Manila, and in herb. Ames.

Dendrochilum Curranii suggests in general habit *D. tenue* (Ames) Pfitz., although the leaves are much broader in proportion to their length and the structure of the flowers is very different. The sepals and petals are strongly involuted near the tips and in the dried state have the appearance of being caudate. When dry, the perianth is whitish, with the tips of the sepals and petals yellow or orange.

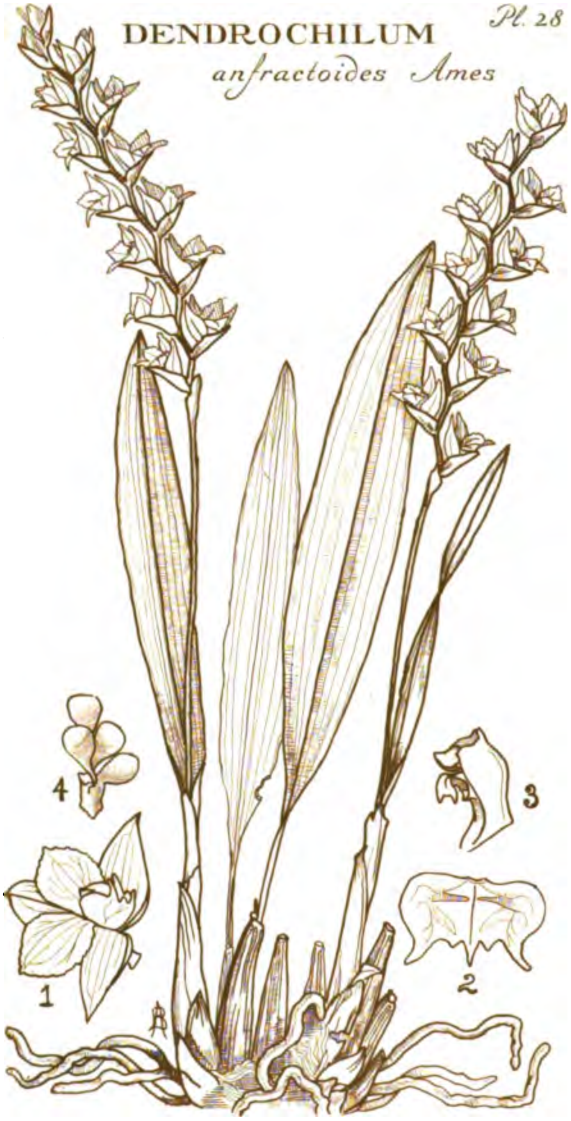
If the inflorescence of *D. tenue* were to be transferred to the foliage of *D. venustulum*, the result would in aspect approach the general appearance of *D. Curranii.*

DENDROCHILUM *Foxworthyi* *Ames*



Pl. 26

PLATE 26: *Dendrochilum Foxworthyi*
I. Plant, natural size. II. Plant, reduced by one half. I and II exhibit extremes of variation in height. A, flower; a, labellum. Both flower and labellum drawn, enlarged, with the aid of the camera lucida.



DENDROCHILUM
anfractoides Ames

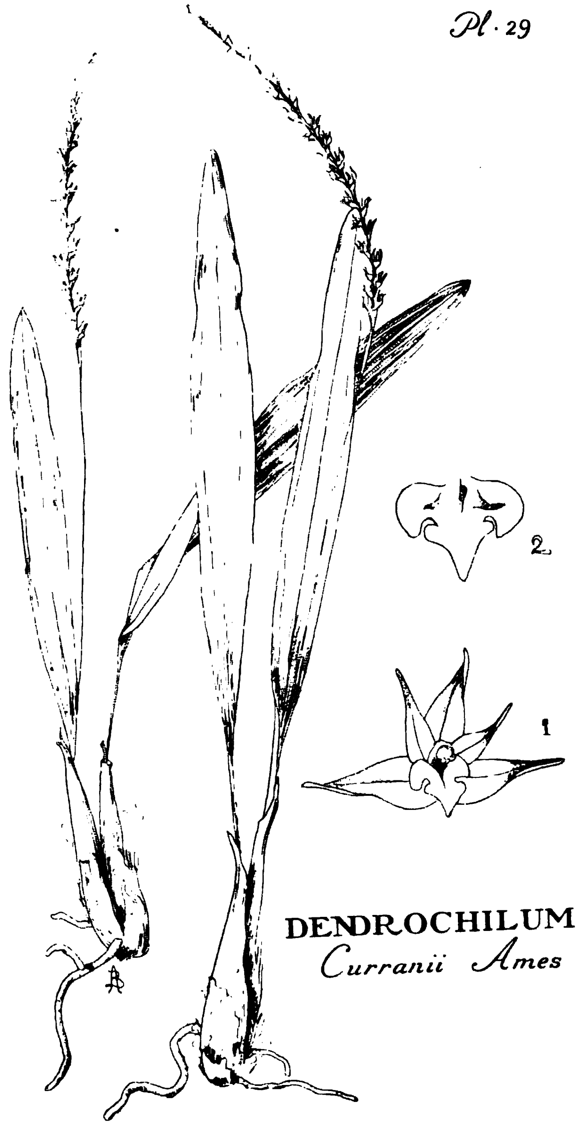
Pl. 28

PLATE 28: *Dendrochilum anfractoides*

Plant, natural size, drawn from the type in the herbarium of the Bureau of Science, Manila, Philippine Islands. 1, flower; 2, labellum; 3, column; 4, pollinia. All parts drawn, enlarged, with the aid of the camera lucida.

PLATE 29: *Dendrochilum Curranii*
Plant, natural size. 1, flower; 2, labellum. Flower and labellum drawn with the aid of the camera lucida from a co-type.

Pl. 29



DENDROCHILUM
Curranii Ames

HÆMARIA MERRILLII

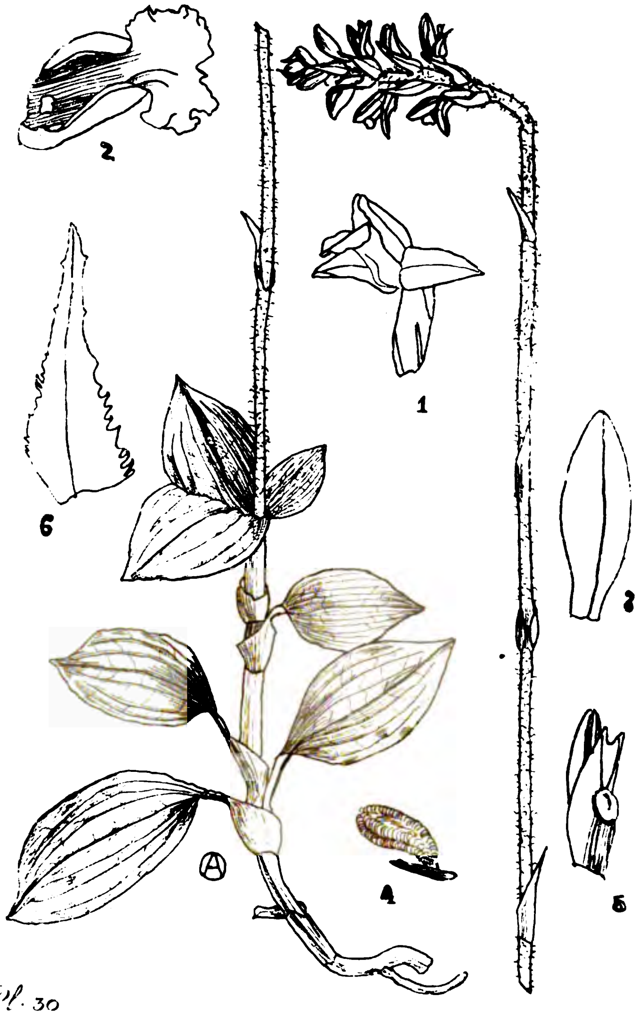
Hæmaria Merrillii Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 315 (1907).

Plant erect or ascending, up to 3 dm. high, leafy at the base. *Rhizome* creeping. *Leaves* 5–7, ovate-lanceolate, shortly acuminate, acute, 1–3 cm. long, 7–15 mm. wide, chartaceous when dry, 7-nerved, shortly petiolate; *petioles* expanded at base into short, inflated *sheaths* which surround the stem. *Peduncle* comparatively slender, smooth or sparsely pubescent below, pubescent above, with four or five acuminate acute *bracts*, the lowermost sheathing. *Raceme* somewhat cylindrical, 7–12-flowered, 2–3 cm. long. *Flowers* whitish, smooth. *Floral bracts* lanceolate, acuminate, acute, from a broad base, exceeding the ovaries, margins ciliolate or denticulate. *Lateral sepals* oblong-lanceolate, acute, 1-nerved, 5–6 mm. long, about 2 mm. wide. *Upper sepal* lightly adherent to the petals, narrowly oblong-lanceolate, subacute, 1-nerved, about 6 mm. long. *Petals* asymmetrical, lanceolate, obtuse, 1-nerved, 6 mm. long, 2 mm. wide above the middle. *Labellum* 5 mm. long, complex, with 2 fleshy protuberances, warts, or rotund *calli* within, somewhat saccate at the base, thickened on each side, expanded at the apex into a membranaceous crenulate-margined transversely oblong retuse mucronate *lamina;* lamina 4 mm. wide, about 2 mm. long. *Column* short, about 4 mm. long to the tip of the anther; *anther* large, exceeding the bifid *rostellum*, 3 mm. long.

PHILIPPINE ISLANDS: Terrestrial in mossy forest at 4300 ft. alt. on Mt. Halcon, Mindoro, flowers white, odorless, calyx greenish, November 13, 1906, *E. D. Merrill* (nos. 5840 *type* & 5819). The description was made from a cotype in herb. Ames.

The Neottiinæ-Physureæ group, according to Pfitzer's treatment of the Orchidaceæ, is made up of twenty-four genera, which, with few exceptions, are difficult to interpret and are separated on characters which must appear trivial to one endeavoring to apply them. In my paper on the Mt. Halcon orchids, I assigned the present species, not without misgiving, to the genus Hæmaria. Undoubtedly close scrutiny of the species which make up the genera allied to Hæmaria will bring about a much broader conception of generic limitations than is now admitted. It would seem that many of the genera in the Physureæ were originally based on a few species, and then perpetuated notwithstanding contradictory evidence brought in by later acquisitions. Obstinate adherence to the present conception of generic limitations, in my judgment, must lead to perplexity in the case of the Physureæ. Natural affinities, at least, are obscured by the tendency to maintain, as distinct, genera which pass into one another by almost imperceptible gradations.

HÆMARIA *Merrillii Ames*



Pl. 30

PLATE 30: *Hæmaria Merrillii*

Plant, natural size. 1, flower; 2, labellum, one of the warts at base represented in full view, the other partly concealed by the margin of the sac; 3, petal; 4, pollen-mass; 5, column, somewhat diagrammatically represented; 6, floral bract. All parts drawn, enlarged, with the aid of the camera lucida from a co-type.

PLEUROTHALLIS REPENS

Pleurothallis (§Apodæ prorepentes) **repens** Ames ORCHIDACEÆ, Fasc. II. p. 271 (1908).—*P. hians* Ames ex J. D. Smith *Enum. Pl. Guatemal.* pt. VIII (Index), not *P. hians* Lindl.

Rhizome slender, creeping. *Secondary stems* ascending, 4–5 mm. apart, 5–10 mm. long, very slender, jointed, clothed with tubular *sheaths*, which are acuminate at the apex. *Leaves* linear-spathulate or narrowly oblanceolate, attenuated at base into a slender *petiole; lamina* 2.5–4.5 cm. long, 3 mm. wide near the apex; *petiole* ± 1 cm. long. *Peduncle* filiform, 7–15 mm. long, with several scarious, aristate *bracts* about 2 mm. long. *Flowers* about four in number, apparently produced in succession, only one at a time being fully expanded. *Bracts* subtending the slender *pedicels*, dilated above, obliquely truncate, acute. *Lateral sepals* free to the base, lanceolate, acute, 1-nerved, 3 mm. long, 1.5 mm. wide. *Upper sepal* somewhat broader than the laterals, otherwise similar to them. *Petals* ovate-acute, 2–2.5 mm. long, 1.5 mm. wide, conspicuously 1-nerved, similar to the sepals in outline and texture. *Labellum* fleshy, narrowly lingulate, subacute, 3 mm. long, 1 mm. wide, margins strongly revolute, surface minutely papillose. *Column* minute, stout, with rounded membranaceous lateral wings or lobes at the summit.

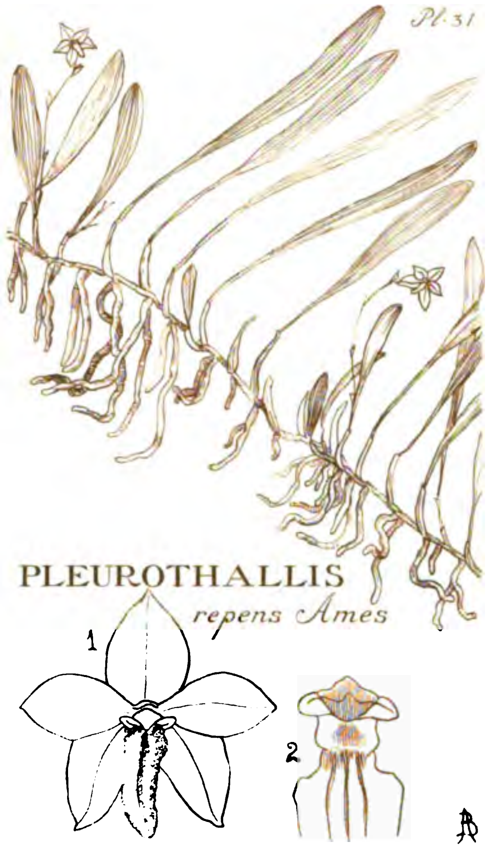
In general habit *Pleurothallis repens* resembles the West Indian *P. Sertularioides* Spreng, although it is distinct from it in detail. The floral parts are very dissimilar, especially the fleshy undivided papillose labellum. From the slender creeping rhizome the secondary stems arise alternately, and lateral branches originate at comparatively long intervals. The younger leaves vary somewhat in outline from the mature ones in being relatively broader in comparison with their length and in possessing very short petioles. The roots are produced in pairs on the rhizome near the point of origin of the secondary stems.

In my herbarium there is a single specimen of *P. repens* communicated by John Donnell Smith, which constitutes the type of the species. This specimen was collected at Cubilquitz, Department of Alta Verapaz, Guatemala, at an altitude of three hundred and fifty metres, by H. von Tuerckheim. The label bears two numbers, namely, 8305, which apparently designates the number under which J. D. Smith distributed his specimens, and 496, which is probably the field-number used by von Tuerckheim.

In his *Enumeratio Plantarum Guatemalensium*, unfortunately, Smith has used my name *Pleurothallis hians* to distinguish this species. *P. hians* is a homonym. This fact was discovered too late for correction in Smith's *Enumeratio.*

PLATE 31: *Pleurothallis repens*

Plant, natural size, reproduced from the type specimen. 1, flower; 2, column and base of labellum. Parts drawn, enlarged, with the aid of the camera lucida.



PLEUROTHALLIS repens Ames

PLEUROTHALLIS JOHNSTONII

P. Johnstonii Ames ORCHIDACEÆ, Fasc. II. p. 271 (1908).

Rhizome creeping, slender, clothed with tubular scarious *sheaths*. *Secondary stems* erect or ascending, about 1.75 mm. long, or shorter. *Sheaths* membranaceous, scarious, lax, truncate. *Leaf* oblong-elliptic, retuse-apiculate at the apex or slightly tridentate, coriaceous, ± 5 mm. long, ± 3 mm. wide. *Peduncle* erect or ascending, filamentous, graceful, few-flowered (with only one flower expanded at a time?), 6–10 mm. long. *Floral bracts* minute, pellucid, 1 mm. long. *Lateral sepals* lanceolate-acute, 1-nerved, free to the base, ± 2.5 mm. long. *Upper sepal* lanceolate, prolonged into a slender filamentous tail, 1 cm. long including the tail; dilated part lanceolate, 2 mm. long. *Petals* linear-lanceolate, 1-nerved, shorter than the sepals. *Labellum* about 1 mm. long, ovate or oblong, obtuse, 3-nerved, fleshy, with a fleshy *callus* at the base. *Column* 0.5 mm. long, margin of the clinandrium entire.

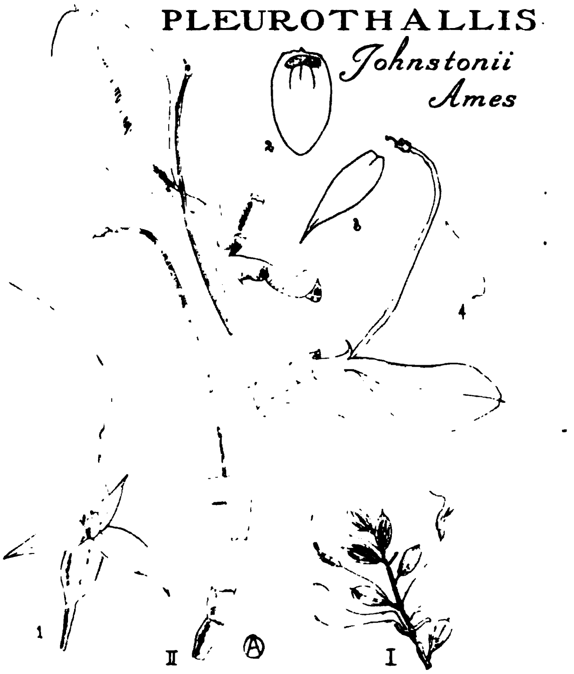
VENEZUELA: Alt. 600 m., Mt. San Juan, Island of Margarita, July 16, 1903, *J. R. Johnston* (no. 238).

The examination of another flower taken from the type specimen has made necessary several important alterations in the original description, in which the dorsal sepal was inadvertently confused with one of the lateral sepals.

PLATE 32: *Pleurothallis Johnstonii*

The drawing is a restoration from the type in the author's herbarium. I. Part of a plant, natural size. II. Part of the plant enlarged and drawn with the aid of the camera lucida. 1, flower; 2, labellum; 3, lateral sepal; 4, petal. Parts drawn, enlarged, with the aid of the camera lucida.

PLEUROTHALLIS *Johnstonii* *Ames*



Pl. 32

PLEUROTHALLIS HIRSUTA

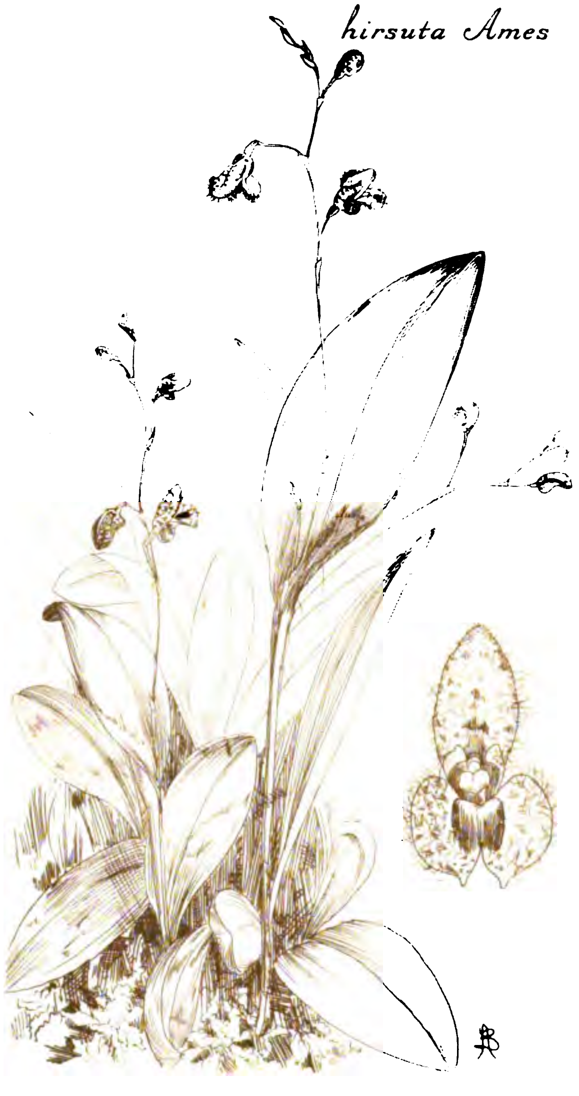
Pleurothallis hirsuta Ames Orchidaceæ, Fasc. ii. p. 270 (1908) with fig.

Plants densely cæspitose. *Secondary stems* 2–2.5 cm. long, semiterete, grooved in front, clothed near the base with an elongated tubular *sheath* which is green when the leaves are immature and scarious when they approach maturity. *Leaf* elliptic-oblong, tridentate or retuse-apiculate at the apex, 3–5.5 cm. long, 1–2 cm. wide, rigid, coriaceous, with a conspicuous median groove. *Raceme* exceeding the leaves. *Floral bracts* tubular, obliquely truncate, acuminate, acute at the apex, 2.5–3 mm. long, much shorter than the pedicels. *Pedicels* 6 mm. long, slender, minutely spotted with madder-purple. *Flowers* 4–10, green in the bud, when mature, greenish yellow, densely and irregularly spotted with madder-purple, partly covered by purplish hairs. *Lateral sepals* apiculate, semi-elliptical, cohering to about the middle, 4–6 mm. long, 2.5 mm. wide, together forming a somewhat orbicular *plate;* outer half of each sepal yellow, spotted with purple and rather densely hairy, inner half almost uniform brown-purple. *Upper sepal* 6–8 mm. long, colored similarly to the outer half of the lateral sepals, somewhat winged dorsally along the median nerve, convex above, concave near the base, margin hirsute, with purplish hairs. *Petals* spathulate, obtuse, 3 mm. long, 1.5 mm. wide near the tip, yellowish with brown-purple spots. Apical half of the *labellum* 2 mm. long, oblong, obtuse, bicarinate or bilamellate; basal half, or *claw*, linear, about 2 mm. long. *Column* 3 mm. long, slender, erect, purple-spotted, irregularly and deeply toothed or fringed at the apex.

Mexico: 1905, *C. G. Pringle* (nos. 8095, 10158 in herb. Ames).

Pl. 33 PLEUROTHALLIS

hirsuta Ames



ORCHIDACEÆ

PLATE 33: *Pleurothallis hirsuta*

Plant, natural size. Separate flower enlarged. Drawn from the living plant which furnished the material on which the original description was based.

PHYSURUS SECUNDUS

Physurus secundus Ames ORCHIDACEÆ, Fasc. II. p. 260 (1908).

Rhizome comparatively stout, creeping, rooting at intervals. *Leaves* about five in number, basal, short-petioled, the basal part of the petioles forming inflated *sheaths* which become scarious; *lamina* ovate-lanceolate, subcordate, acute, 2–3 cm. long, 1.6 cm. wide. *Scape* erect, smooth below or only sparsely hairy, pubescent above, about 1 dm. long, with about three tubular sheathing acuminate acute *bracts*. *Raceme* about 6 cm. long. *Flowers* secund, about 16 in number. *Floral bracts* smooth, lanceolate, acuminate, acute, about equalling the sessile *ovary*, 5–7 mm. long. *Ovaries* ellipsoidal, smooth. *Perianth* white (?). *Lateral sepals* lanceolate, acute, 1-nerved, 4–5 mm. long, 2 mm. wide. *Upper sepal* adherent to the petals, oblong-lanceolate, 1-nerved, concave, about 4 mm. long. *Petals* somewhat spathulate, 1-nerved, minutely denticulate on the free margin, 4–5 mm. long. *Labellum* produced at base into a blunt scrotiform *spur; lamina* oval, 3-nerved, entire, about 8 mm. long, somewhat contracted at the blunt apex into a minutely fringed or denticulate *plate; spur*, or *sac*, 3–3.5 mm. long, about 2 mm. in diameter, blunt and grooved at the tip; within, near the tip are several minute, rather fleshy, subclavate *hairs*, or elongated *papillæ*. *Column* slender, about 3.5 mm. long.

MEXICO: Sierra de Reyes, at 9000 ft. alt., State of Oaxaca, November 9, 1894, *C. G. Pringle* (no. 5837). Type, consisting of a single plant, in herb. Gray.

The description given above has been made anew from the type. As more material comes to light variations from the measurements noted in the description may be expected. The species of the genus Physurus are often variable in the vegetative parts, as may be noted in *Physurus querceticola* Lindl., a species found in Florida, the extreme forms of which might be mistaken at first glance for distinct species.

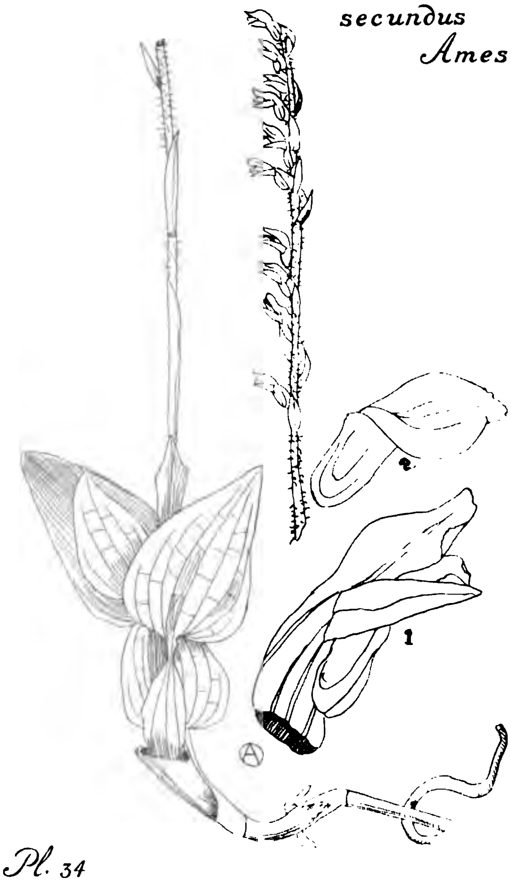
Physurus secundus is in habit very similar to *Epipactis repens,* although generically unlike it.

PLATE 34: *Physurus secundus*

The drawing is a restoration from the type in the Gray Herbarium. The plant is represented natural size. 1, flower; 2, labellum. Parts drawn, enlarged, with the aid of the camera lucida.

PHYSURUS

secundus
Ames



Pl. 34

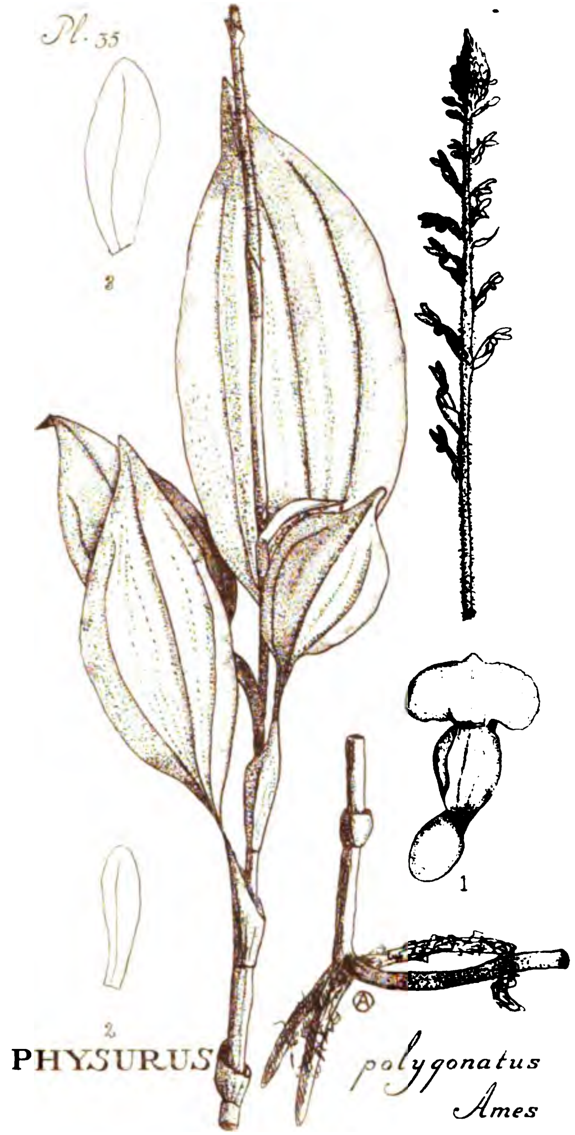
PHYSURUS POLYGONATUS

Physurus polygonatus Ames in J. D. Smith *Enum. Pl. Guatemal.* pt. VII. p. 50, no. 7678 (1905), *nomen;* ORCHIDACEÆ, Fasc. II. p. 259 (1908).

Plant 26.3 cm. high from a creeping *rhizome*. *Stem* rather stout, below the leaves smooth. *Leaves* smooth, asymmetrically ovate-lanceolate to elliptic-oblong, abruptly acuminate, acute, conspicuously 3-nerved, 3–7 cm. long, 1.6–3 cm. wide; *petioles* slender, dilated at base into scarious *sheaths*. Above the leaves the stem is pubescent and sheathed by 3 lanceolate, acute *bracts*. *Raceme* ±6 cm. long, rather loosely many-flowered. *Rhachis* finely pubescent. *Floral bracts* lanceolate, acuminate, acute, sparsely pubescent, exceeding the sparsely pubescent *ovaries*, 5–8 mm. long. *Flowers* small. *Lateral sepals* sparsely pubescent, oblong-lanceolate, obtuse, 1-nerved, 4 mm. long, about 2 mm. wide. *Upper sepal* linear-lanceolate, 1-nerved, sparsely pubescent, narrower than the laterals. *Petals* narrowly spathulate, 1-nerved, 4 mm. long. *Labellum* from the tip of the spur to the apex of the subreniform *plate*, 5 mm. long; *plate* mucronate, 2 mm. long, 3 mm. wide.

The single specimen which constitutes the type was collected at Cubilquitz in Guatemala, by H. von Tuerckheim. The specific name alludes to the resemblance of the foliage to that of some species of the genus Polygonum. *P. polygonatus* appears to be closely allied with *P. repens* Lindl. and *P. hyphæmaticus* Reichb. f. I have been unable to identify my material satisfactorily with any of the species contained in the herbarium of the British Museum of Natural History or of the Royal Gardens at Kew, or in any of the large collections which I have consulted.

PLATE 35: *Physurus polygonatus*
Plant, natural size. 1, labellum; 2, petal; 3, lateral sepal. All of the parts were drawn with the aid of the camera lucida from the type.



PHYSURUS polygonatus Ames

PHYSURUS PURPUREUS

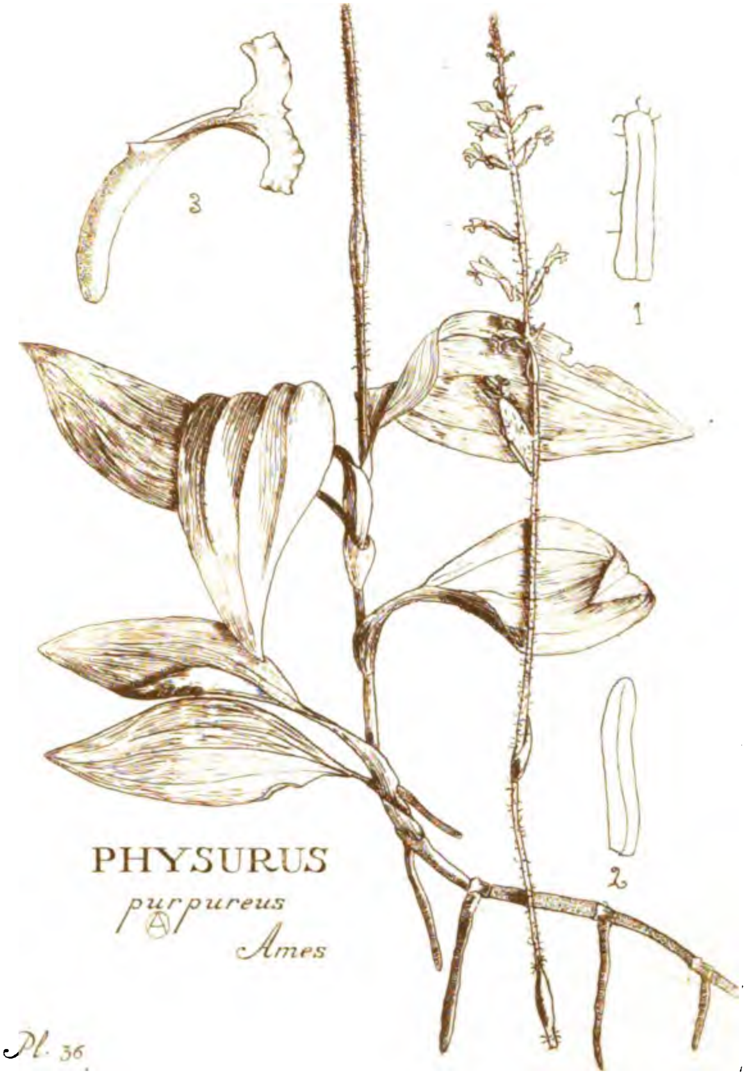
Physurus purpureus Ames in J. D. Smith *Enum. Pl. Guatemal.* pt. VII. p. 50, nos. 8000 and 8759 (1905), *nomen;* ORCHIDACEÆ, Fasc. II. p. 259 (1908).

Plant leafy near the base, slender, from an elongated creeping *rhizome. Leaves* dark red-violet in color, about 6 in number, membranaceous, conspicuously 3-nerved when dry, lanceolate, acute, tapering at the base, 4–5 cm. long, 1.5–2 cm. wide; *petiole* slender above, dilated into loose nervose *sheaths* which embrace the slender stem. *Stem* above the leaves 14 cm. long, silky-pubescent, clothed at intervals by linear-lanceolate acute *bracts. Raceme* 6.5 cm. long, rather loosely many-flowered. *Floral bracts* about equalling the ovaries, exceeded by the fruit. *Ovaries* sparsely hairy. *Lateral sepals* sparsely pubescent, linear-oblong, obtuse, 1-nerved, 4 mm. long, 1 mm. wide. *Upper sepal* similar to the laterals. *Petals* similar to the lateral sepals, smooth. *Labellum* prolonged into a cylindrical *spur* at base, narrowed above the spur into a grooved *mesochil; epichil* a lunate or bifalcate minutely denticulate mucronate *plate,* 4 mm. wide; *spur* 3.5 mm. long.

The specific name of the plant alludes to the color of the leaves, which in life, according to the collector's observations, were dark red-violet. *P. purpureus* was collected by H. von Tuerckheim in Cubilquitz, Guatemala, in June, 1904. The type specimen (in herb. Ames) bears the number 8759.

PLATE 36: *Physurus purpureus*

Plant, natural size, reproduced from the type. 1, lateral sepal; 2, petal; 3, labellum. All analytical parts drawn, enlarged, with the aid of the camera lucida.



PHYSURUS
purpureus
Ames

Pl. 36

PHYSURUS VENUSTULUS

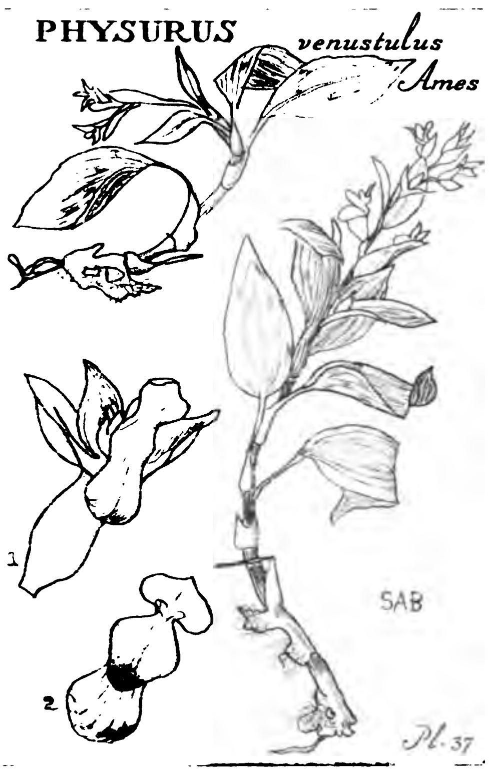
Physurus venustulus Ames in J. D. Smith *Enum. Pl. Guatemal.* pt. VII. p. 50, no. 8591 (1905), *nomen;* ORCHIDACEÆ, Fasc. II. p. 261 (1908).

Plants among the smallest of the genus, 6–10 cm. high, erect or ascending from an elongated fleshy creeping *rhizome. Leaves* membranaceous, nervose, lanceolate, acute, 1–3 cm. long, 5–10 mm. wide; *petiole* slender, forming a sheath at base, which loosely clothes the stem. *Stem* glabrous, succulent. *Raceme* few- or many-flowered; *rhachis* smooth. *Floral bracts* foliose, lanceolate, acute, equalling or exceeding the ovaries. *Flowers* subglobular, white, about 3 mm. long. *Lateral sepals* oblong-lanceolate, 1-nerved, obtuse, 3.5 mm. long, 1.5 mm. wide. *Dorsal sepal* lanceolate, obtuse, 1-nerved. *Petals* linear-lanceolate, 1-nerved, asymmetrical, 3.5 mm. long, 1 mm. wide. *Labellum* globular-saccate at base, dilated into a suborbicular or subreniform apiculate *plate* above the concave *mesochil; sac* 3-nerved, 2 mm. long, at base 2 mm. wide; *mesochil* 2 mm. long; *plate* or epichil 1.5 mm. long, 2 mm. wide, with a transverse membranous ridge between it and the mesochil.

The type was collected by H. von Tuerckheim (no. 8591) at Cubilquitz, Guatemala, at an altitude of three hundred and fifty metres, in December, 1903. My material appears to be conspecific with an unnamed specimen in the herbarium at Kew, collected by R. Tate (no. 464) in Nicaragua, in 1867–8. In habit the plants resemble depauperate specimens of *Physurus querceticola* Lindl. They appear to have been flaccid when alive, and somewhat succulent. I have been unable to discover that this species has been heretofore described.

Plate 37: *Physurus venustulus*

Two plants, natural size. 1, flower enlarged; 2, labellum showing sac, mesochil and epichil, enlarged. All parts drawn from the type specimen with the aid of the camera lucida.



PHYSURUS *venustulus* Ames

EPIPACTIS CLAUSA

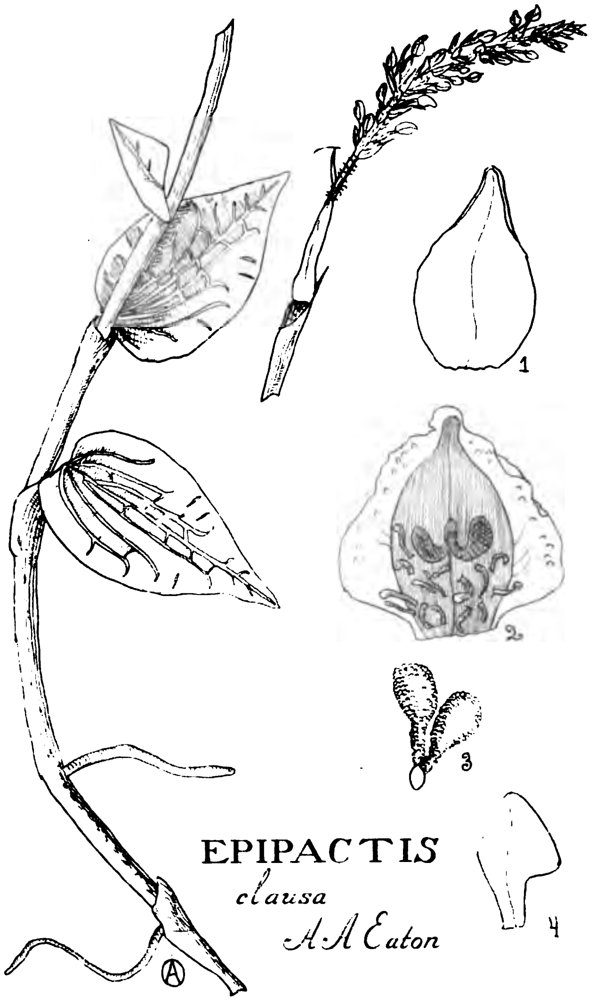
Epipactis clausa A. A. Eaton *in MS.*

The solitary *plant* which composes the type specimen is about 2 dm. tall, ascending or erect from an elongated creeping *rhizome*. *Leaves* three, 2–3 cm. apart, dark green with whitish or yellowish veins, ovate-lanceolate, acuminate, acute, the margin minutely crenulate (when dry?); *lamina* of the largest leaf 3.5 cm. long, 1.8 cm. wide above the middle; uppermost leaf bract-like; *petiole* very short, or none, consequently the lamina of each leaf has the appearance of being sessile on an inflated *sheath*, which is about 1 cm. long and which clothes the thickened *stem*. *Raceme* rather dense, about 4 cm. long, with a slender pubescent *rhachis* and lanceolate acute *bracts* subtending the somewhat globular *flowers*. *Lateral sepals* coherent at base, ovate, 1-nerved, obtuse, the apical margin involute. *Petals* asymmetrical, 1-nerved, obtuse, above the claw dilated into a subrhombic irregularly lanceolate or subdolabriform *plate*. *Labellum* lightly saccate at the base, very broadly ovate when flattened out, contracted at the apex into a blunt point; margin irregularly crenulate, with scattered minute almost invisible *papillæ;* within the sac are several clavate hairs, and near its middle, arising from the median nerve, two relatively large clavate *processes*. *Anther* exceeding the rostellum.

PHILIPPINE ISLANDS: Canlaón Volcano, Negros Occidental, March, 1902, *C. S. Banks* (without number, marked as type, in the herbarium of the Philippine Bureau of Science).

The specimen on which the description is based has minute globular flowers which have the appearance of being partially closed owing to their immature condition. Whether or not these flowers exhibit the normal and characteristic tendencies of the inflorescence, the material at hand does not warrant an expression of opinion.

Pl. 38



EPIPACTIS
clausa
A. A. Eaton

PLATE 38: *Epipactis clausa*

Plant, natural size, drawn from the type specimen, the leaves represented as without crenulate margins. 1, lateral sepal; 2, labellum; 3, pollinia; 4, petal. All the parts much enlarged, and drawn with the aid of the camera lucida.

EPIPACTIS DOLABRIPETALA

Epipactis dolabripetala Ames ORCHIDACEÆ, Fasc. II. p. 262 (1908).

Related to *E. striata* (Reichb. f.) A. A. Eaton. *Plant* erect or ascending, 3 dm. high from an elongated creeping thickened *rhizome*. *Leaves* about 4 in number, approximate near the base of the stem; *lamina* lanceolate, acute, 3–5 cm. long, 1.4–2 cm. wide; *petiole* slender at the base of the lamina, scarious, dilated and sheathing where it joins the stem, 7–14 mm. long. *Peduncle* slender, finely pubescent, clothed with 4 oblong acute *bracts*, the lowermost of which are sheathing at base. *Raceme* somewhat cylindraceous, rather loosely flowered, 7 cm. long; *rhachis* finely pubescent. *Floral bracts* lanceolate, acuminate, acute, sparsely hairy, equalling the sparsely hairy *ovaries*, or shorter than the ovaries of the uppermost flowers. *Lateral sepals* 4.5 mm. long, 1-nerved, lanceolate. *Upper sepal* narrower than the laterals, 1-nerved, 4.5 mm. long. *Petals* dolabriform, 1-nerved, about 5 mm. long. *Labellum* 4.5 mm. long, ovate-lanceolate, slightly saccate at base, with several minute, thickened *hairs* within the sac.

MEXICO: Collected near San Cristobal in Chiapas, at an altitude ranging between 7000 and 8800 ft., September 18, 1895, by *E. W. Nelson* (no. 3211). Type in U. S. National Herb.

The type is composed of a single specimen preserved in the United States National Herbarium, from which the accompanying illustration was prepared. In accordance with the view held by A. A. Eaton,* I have adopted the generic name Epipactis of Boehmer for those species which have been heretofore improperly placed in the genus Goodyera of R. Brown.

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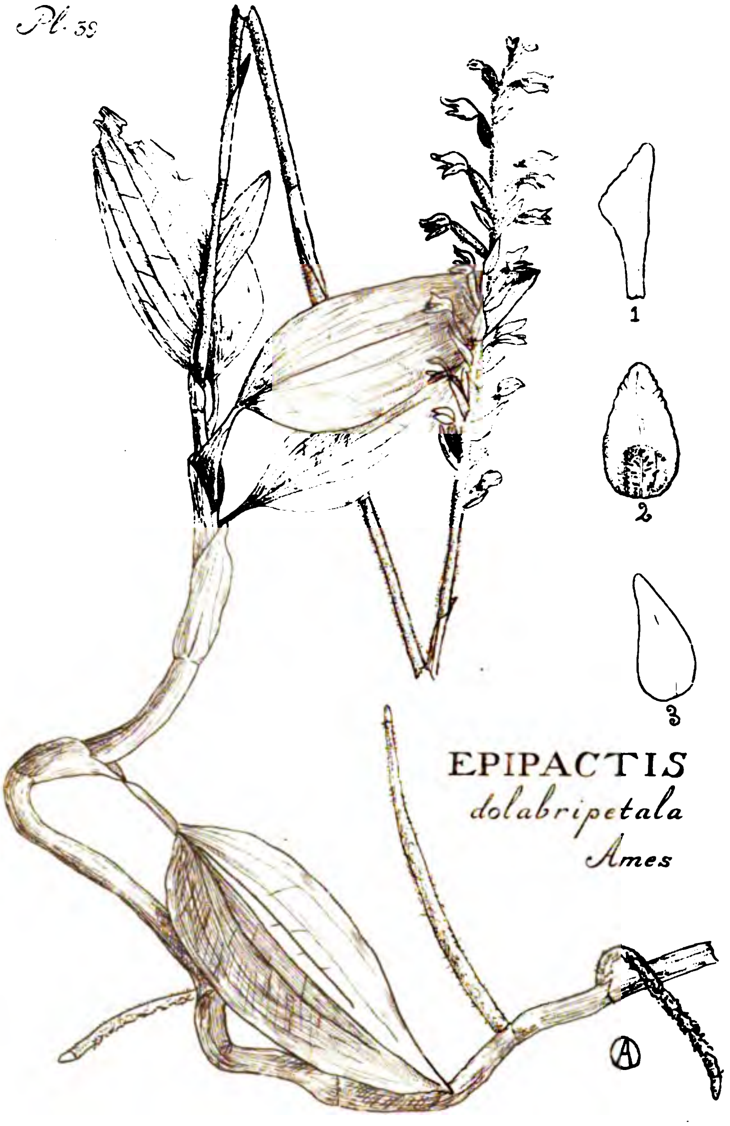
* *Proceedings of the Biological Society of Washington* 21: 63 (1908).

Pl. 59



EPIPACTIS
dolabripetala
Ames

PLATE 39: *Epipactis dolabripetala*
Plant, natural size. 1, petal; 2, labellum; 3, lateral sepal. All the parts enlarged and drawn from the type-specimen with the aid of the camera lucida.

CHEIROSTYLIS OCTODACTYLA

Cheirostylis octodactyla Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 314 (1907).

"Related to *C. Griffithii* Lindl. *Plants* rather stout in relation to their height, 4–8 cm. tall, few-flowered. *Leaves* ovate-lanceolate, acute, 0.7–2 cm. long, 5–11 mm. wide, 5–6 mm. apart on the stem. *Petioles* short, sheathing at base. *Flowers* one or two, white, 1 cm. long, standing at right angles to the erect *stem. Lateral sepals* united nearly to the apex, lanceolate, subacute, 8 mm. long. *Upper sepal* oblong-lanceolate, acute, somewhat dilated near the base, 8 mm. long. *Petals* lightly adhering to the upper sepal, linear spathulate, about 8 mm. long, 2 mm. wide near the tip. *Labellum* linear-oblong, about 9 mm. long to the tip of the slightly dilated 8-fingered apex, 2.5 mm. wide at base; on each side a row of 7–8 setæ. Digitate divisions of the apex 3 mm. long."—Ames, *loc. cit.*

At the base the lip is concave or lightly saccate, with a row of blunt setæ on each side. The column is short, with two erect processes at the summit in addition to the rostellar arms.

PHILIPPINE ISLANDS: *C. octodactyla* was collected at an altitude of 8200 ft. on Mt. Halcon, Mindoro, on November 22, 1906, by *E. D. Merrill* (no. 5834).

CHEIROSTYLIS

octodactyla
Ames

Pl. 40

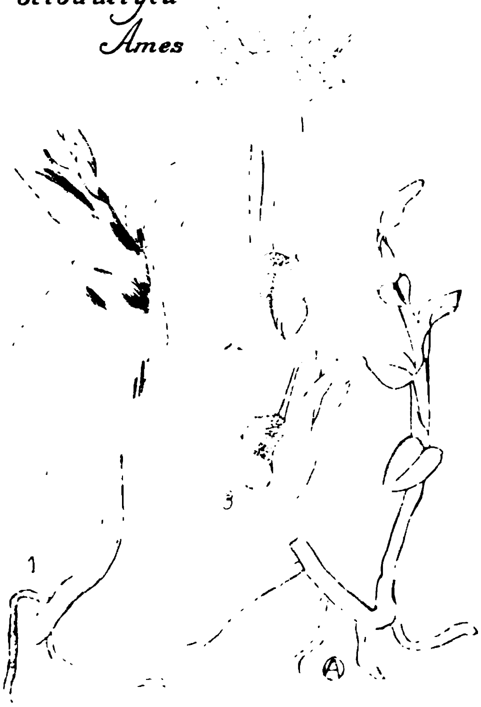


PLATE 40: *Cheirostylis octodactyla*
Two plants, natural size. 1, petal; 2, labellum; 3, column. All the parts drawn, enlarged, from a co-type with the aid of the camera lucida.

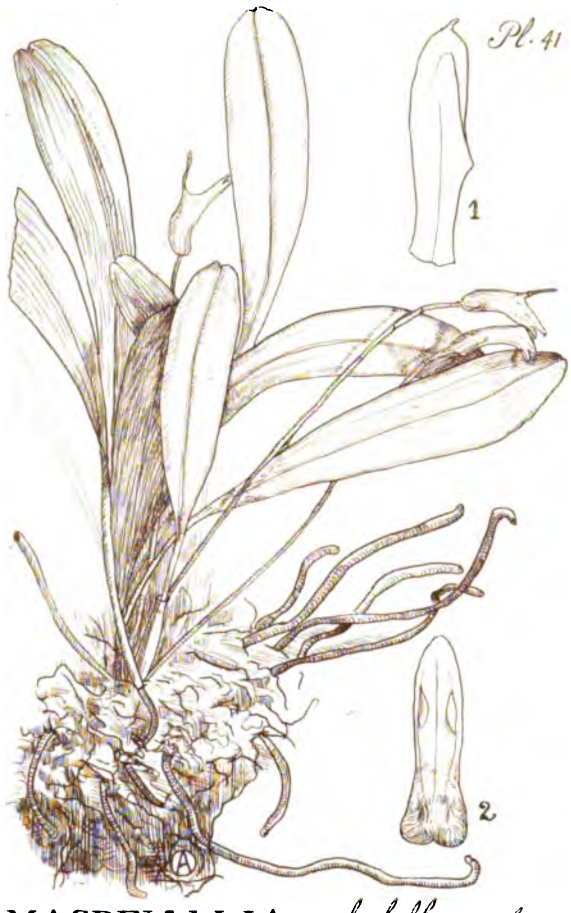
MASDEVALLIA TUBULIFLORA

Masdevallia tubuliflora Ames ORCHIDACEÆ, Fasc. II. p. 265 (1908).

Allied with *M. floribunda* Lindl. *Secondary stems* erect or obliquely ascending, 1 cm. long. *Leaf* oblanceolate, obtuse, minutely bidentate, coriaceous, 8–10 cm. long, 9–11 mm. wide above the middle. *Scape* very slender, about 7 cm. long. *Calyx* about 12 mm. long to the tip of the dorsal lobe, 8 mm. long to the base of the dorsal lobe; *lateral lobes* 6–7 mm. long, 3-nerved, falcate-lanceolate; *dorsal lobe* linear, fleshy, 4–5 mm. long. *Petals* linear-lanceolate, with a small curved apicule or tooth on the anterior margin, 1-nerved, 4 mm. long. *Labellum* 4 mm. long, linear, subacute or obtuse, cordate and somewhat thickened at the base, lamellate above the middle, the lamellæ rounded, short and thin. *Column* 3.5 mm. long.

GUATEMALA: At an alt. of 350 m., Depart. Alta Verapaz, *H. von Tuerckheim* (no. 512). Type in herb. Ames (no. 7339).

In John Donnell Smith's distribution of Guatemalan plants *Masdevallia tubuliflora* bears the number 8296. Up to the present time I have been unable to identify my material with any known species of the genus, although I have made careful comparisons with the specimens in the herbaria at the Royal Gardens, Kew, and the British Museum of Natural History.



MASDEVALLIA *tubuliflora Ames*

PLATE 41: *Masdevallia tubuliflora*

Plant, natural size, drawn from the type. 1, petal; 2, labellum. These parts much enlarged and drawn with the aid of the camera lucida.

MASDEVALLIA TUERCKHEIMII

Masdevallia Tuerckheimii Ames ORCHIDACEÆ, Fasc. II. p. 265 (1908).

Allied with *M. Rolfeana* Kränzl. *Secondary stems* erect, sheathed by tubular scarious *bracts* when young. *Leaf* coriaceous, 6–10 cm. long, oblanceolate or spathulate, attenuated below into a slender *petiole,* obtuse, minutely tridentate with a conspicuous median nerve. *Peduncle* ascending, subfiliform, up to 5 cm. long, bearing two rather large *flowers,* only one of which is open at a time. *Bracts* erect, scarious, tubular. *Calyx* about 1.5 cm. long, subcoriaceous, tubular below, 3-lobed above, the *lobes* terminating in slender filamentous tails. *Lateral lobes* ovate, 3-nerved, 1.7 cm. long, the tails 3 mm. long. *Dorsal lobe* subrotundate, 3-nerved, 19 mm. long, the tail longer than that of each lateral lobe. *Petals* linear-oblong, 5 mm. long, 1.5 mm. wide, truncate at the apex, apiculate or retuse and minutely unidentate, with a protuberance at the middle on the anterior margin. *Labellum* linear-oblong, cordate at base, obtuse, bilamellate. *Column* fleshy, about as long as the petals.

GUATEMALA: Alt. 350 m., Cubilquitz, Depart. Alta Verapaz, August, 1903, *H. von Tuerckheim* (no. II 464). Type no. 5832 in herb. Ames.

The type of *M. Tuerckheimii* is represented by a single specimen, from which the accompanying plate has been prepared.

Pl. 42

MASDEVALLIA
Tuerckheimii Ames

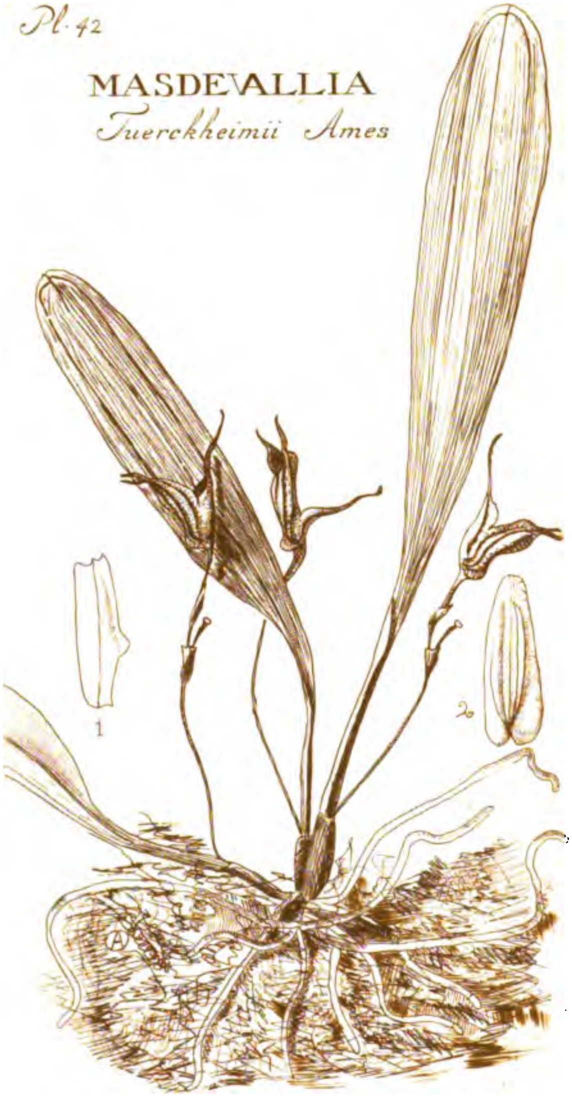


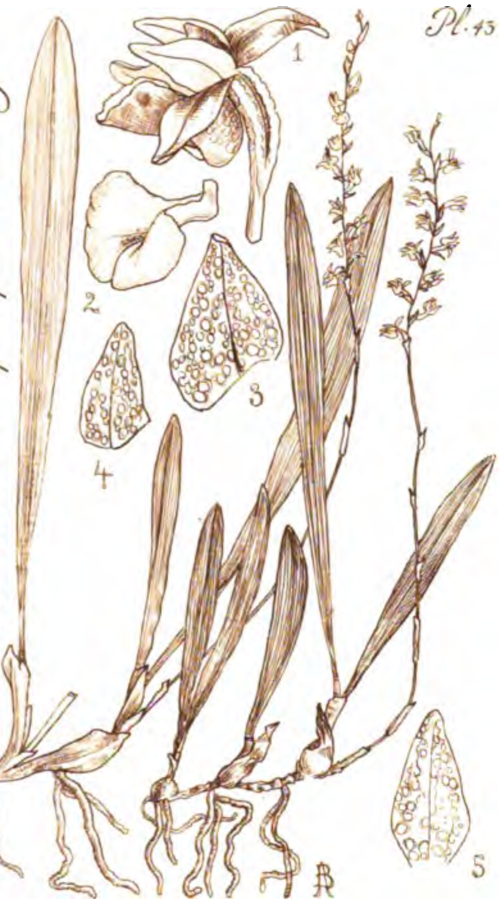
PLATE 42: *Masdevallia Tuerckheimii*
1, petal; 2, labellum. Both petal and labellum drawn, enlarged, with the aid of the camera lucida.

PHREATIA PROREPENS

Phreatia prorepens Reichb. f. *Otia bot. Hamb.* 54 (1878) in syn. and *Xen. Orch.* 3: 31, in syn.; Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 332 (1907); ORCHIDACEÆ, Fasc. II. p. 205 (1908).—*Eria prorepens* Reichb. f. *Otia bot. Hamb. loc. cit.* and *Xen. Orch. loc. cit.*

The specimen in the Gray Herbarium, determined by Reichenbach, has *leaves* 5.5–6.7 cm. long, 7–8 mm. wide. The *scape* is longer than the leaves, very slender, with about 5 sheathing aristate-pointed *bracts*, 5–7 mm. long. *Perianth* about 2 mm. long. These measurements agree almost perfectly with the specimen collected on Mt. Halcon, Mindoro, Philippine Islands, from which the accompanying etching was prepared. The Gray Herbarium specimen, which was collected in the Philippines by the Wilkes Expedition, was among the novelties which Reichenbach described in *Otia botanica Hamburgensia*, in 1878. As many of these are known to botanists only through the original descriptions, the accompanying plate should prove a welcome addition to the illustrations of obscure or little known orchid species.

Pl. 43



PHREATIA prorepens Reichb. f.

PLATE 43: *Phreatia prorepens*

The plate has been prepared from material collected on Mt. Halcon, Mindoro, Philippine Islands. Plant, natural size. 1, flower; 2, labellum; 3, lateral sepal; 4, petal; 5, upper sepal. All parts drawn enlarged with the aid of the camera lucida.

BULBOPHYLLUM ALAGENSE, B. HALCONENSE, B. PLEUROTHALLOIDES

Bulbophyllum (§Monanthaparva) **alagense** Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 333 (1907).

Rhizome slender, creeping. *Pseudobulbs* approximate to each other or sometimes 2 cm. apart, pyriform, 4–6 mm. long, narrowed above, at base 3–4 mm. in diameter. *Leaves* ovate, apiculate, 1.2–2 cm. long, 4–9 mm. wide; *apicule* 0.75 mm. long, awn-like. *Scape* very slender, filiform, exceeding the pseudobulbs, 8–11 mm. long, sheathed at base by a tubular truncate 1–2 mm. long *bract*. *Flower* solitary, pale yellow, nearly white. *Pedicel* slender, graceful, subtended by a loose tubular obliquely truncate apiculate 2 mm. long *bract*, which is dilated above. *Sepals* triangular-lanceolate, 5–7 mm. long, caudate-tipped, the tails about 4 mm. long. *Petals* minute, about 2 mm. long, spathulate, acute. *Labellum* about 1.5 mm. long, strongly curved, 3-lobed; *lateral lobes* erect, half-round, when spread out forming an orbicular *plate*, 1 mm. long, 1 mm. wide; *middle lobe* fleshy, oblong, obtuse, about 1 mm. long. *Column* minute with blunt wings.

PHILIPPINE ISLANDS: On mossy branches overhanging the water along the Alag River, Mindoro, at 1250 ft. alt., November 12, 1906, *E. D. Merrill* (no. 5494).

Bulbophyllum (§Monanthaparva) **halconense** Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 334 (1907).

"*Rhizome* thread-like, less than 1 mm. thick. *Pseudobulbs* 1–3 cm. apart, round-pyriform when mature, rugose when dry, about 5 mm. long, about 4 mm. in diameter at base. *Leaves* narrowly elliptic-oblong, very fleshy (not apiculate), 1.5–2.5 cm. long, 4–6 mm. wide, acute, contracted into a very slender *petiole*. *Scape* exceeding the pseudobulbs, filiform, 1.5–3 cm. long, sheathed at base. *Flower* solitary, relatively large. *Pedicel* filiform, subtended by a tubular obliquely truncate apiculate *bract* dilated at its mouth. *Lateral sepals* narrowly lanceolate, caudate-tipped, 12–14 mm. long, about 3 mm. wide near the base. *Upper sepal* similar to the laterals, 12–14 mm. long, caudate-tipped. *Petals* ovate, acute, 5 mm. long, 2.5 mm. wide. *Labellum* lanceolate from a cordate base, acute, dilated at the middle, 3.5–4 mm. long, 2 mm. wide. (From dried specimens it appears to have been strongly convex in life.) *Column* short with a minute tooth in front at about the middle."—Ames, *loc. cit.*

Philippine Islands: On trees in ridge forest, flowers dark purple, at 4500–6800 ft. alt. on Mt. Halcon, Mindoro, November 16, 1906, *E. D. Merrill* (no. 5832). On the same sheet with the type is a small species of the Monanthaparva section with much smaller flowers and shorter scapes.

Bulbophyllum (§Monanthaparva) **Pleurothalloides** Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 335 (1907).

"*Rhizome* obscure. *Pseudobulbs* 3 mm. long, much depressed, forming a chain. *Leaves* about 1 cm. long, 2–4 mm. wide, oblanceolate to spathulate, obtuse, minutely apiculate, contracted below into a slender *petiole*. *Scapes* filiform, elongated, exceeding the leaves, 3 cm. long, with scarious *sheaths* at base, and with a tubular obliquely truncate *bract* subtending the solitary, minute, brownish yellow *flower*. *Lateral sepals* lanceolate, acute, about 4 mm. long, 2.5 mm. wide, 3-nerved. *Upper sepal* similar and equal to the laterals. *Petals* lanceolate, 2 mm. long, 0.75 mm. wide. *Labellum* lanceolate-cordate, obtuse or subsagittate, 2 mm.

long, 1 mm. wide at base, about 0.5 mm. wide near the tip. *Column* 1 mm. long."—Ames, *loc. cit.*

PHILIPPINE ISLANDS: On mossy trunks of trees at 4500 ft. alt. on Mt. Halcon, Mindoro, November 14, 1906, *E. D. Merrill* (no. 6128).

In habit *B. Pleurothalloides* is allied to *B. cernuum* (Blume) Lindl., but has very different leaves. The general aspect of the plant when in flower recalls some species of Pleurothallis.

The three Bulbophyllum species which are illustrated in the accompanying plate were collected by Elmer D. Merrill, in November, 1906, during the ascent of Mt. Halcon, one of the loftiest summits in the Philippine Islands. While making this ascent more than one hundred orchid species were discovered by Merrill, many of them novelties. These were dealt with in my paper entitled *Orchidaceæ Halconenses,* which appeared in July, 1907, in the second volume of the *Philippine Journal of Science.* Among the Bulbophyllums collected, the three here figured I have been unable to identify with any known species. They belong to the interesting, rather large and puzzling section which Ridley designated by the name Monanthaparva, in allusion to the smallness of the vegetative parts and the relatively small solitary flower on a slender scape. In the habital illustration of *B. Pleurothalloides* (II) the contiguous bulbs, which form a rhizome-like chain, are well shown.

Pl. 44

BULBOPHYLLUM

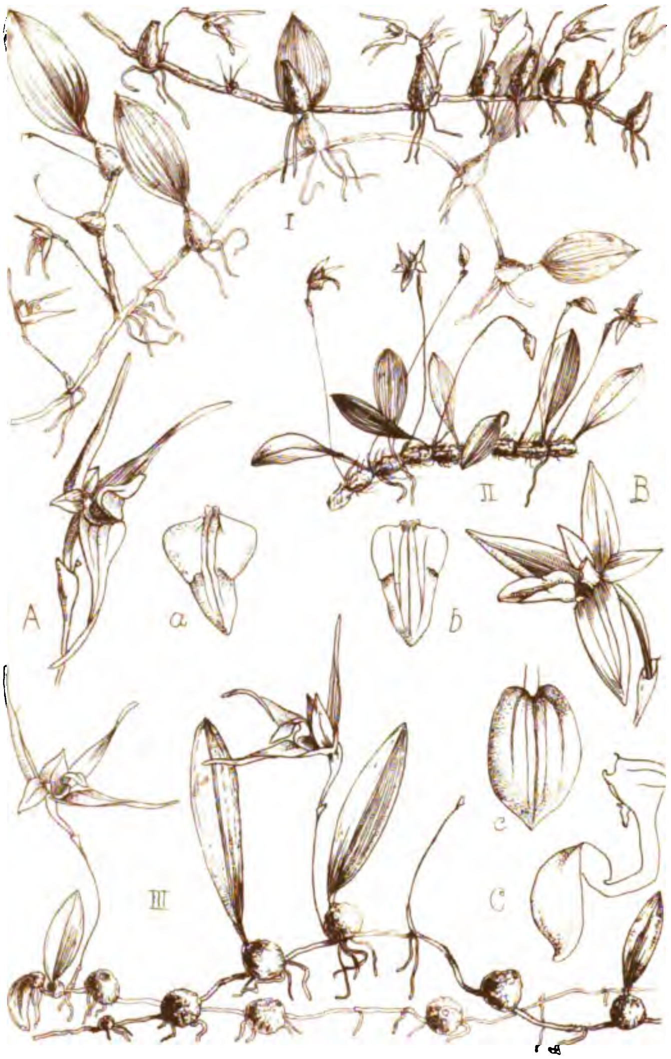


PLATE 44: *Bulbophyllum species*

I. *B. alagense*, natural size. A, flower; a, labellum. II. *B. Pleurothalloides*, natural size. B, flower; b, labellum. III. *B. halconense*, natural size. C, labellum and column; c, labellum. All the analytical parts, as well as the separated flowers, have been drawn, enlarged, with the aid of the camera lucida, from co-types.

BULBOPHYLLUM MINDORENSE

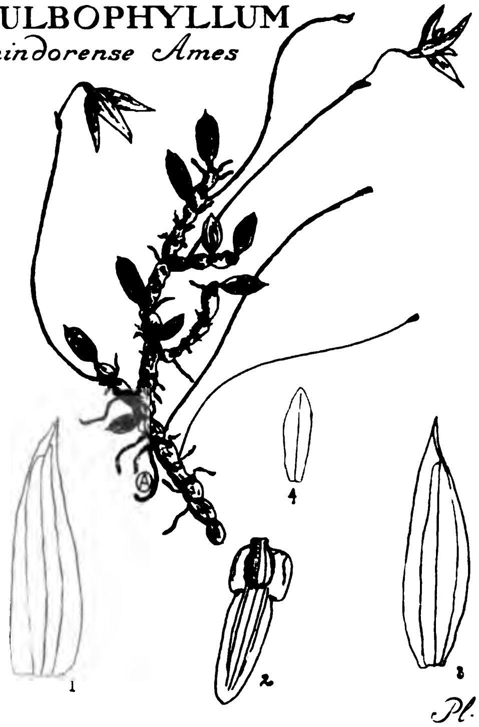
Bulbophyllum (§Monanthaparva) **mindorense** Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 334 (1907).

Rhizome inconspicuous, concealed by the depressed 3–4 mm. long *pseudobulbs*, which form a continuous sometimes branching chain closely appressed to the bark of trees on which the species is epiphytic. *Leaves* lanceolate, acute, 6–8 mm. long, up to 3 mm. wide, shortly petiolate. *Scapes* filiform, up to 4 cm. long. *Flower* straw-yellow, relatively large, with a very long *pedicel*, apparently without a subtending bract, the *pedicel* being fully 5 mm. long. *Floral bract* tubular, obliquely truncate. *Lateral sepals* narrowly lanceolate, acute, 3-nerved, 8 mm. long, 2 mm. wide below the middle, margin minutely ciliolate. *Upper sepal* similar to the laterals, about equally long. *Petals* linear-oblong, subspathulate, acute, 1-nerved, 3 mm. long, about 0.75 mm. wide. *Labellum* linear-lanceolate, 3.5 mm. long, about 1 mm. wide. *Column* 1 mm. long, with a tooth or protuberance in front near the base or below the middle.

PHILIPPINE ISLANDS: Epiphyte in deep shaded ravine, at 3000 ft. alt., on Mt. Halcon, Mindoro, November 27, 1906, *E. D. Merrill* (no. 5796).

In the description the lateral sepals are said to be ciliolate on the margin. This statement refers to the minute papillose cells which are visible under the high powers of the dissecting microscope. The labellum, as shown in the drawing, is somewhat roundish at the base, and lightly concave, in general outline linear-lanceolate, and 3-nerved, each of the lateral nerves giving off a branch which runs nearly to the apex of the labellum. The pseudobulbs are as in *Bulbophyllum cernuum* (Blume) Lindl.

BULBOPHYLLUM
mindorense Ames



Pl. 45

ORCHIDACEÆ

PLATE 45: *Bulbophyllum mindorense*
Plant, natural size, drawn from a co-type. 1, lateral sepal; 2, labellum; 3, upper sepal; 4, petal. All parts drawn, enlarged, with the aid of the camera lucida.

DENDROBIUM ORNITHOFLORUM

Dendrobium (§Grastidium) **ornithoflorum** *sp. nov. Herba* multum ramosa. *Caules* teretes, ±6 dm. longi, ascendentes vel erecti, graciles. *Folia* lineari-lanceolata, acuminata, acuta, 2.5–10 cm. longa, 4–5 mm. lata. *Pedunculus* 10–12 mm. longus. *Pedicelli* 14 mm. longi. *Flores* geminati. *Sepala lateralia* triangulari-lanceolata, acuta, subcaudata, circa 1.6 cm. longa. *Sepalum dorsale* lineari-lanceolatum, circa 1.6 cm. longum, 3 mm. latum. *Petala* similia, angustiora, 3-nervia. *Labellum* ±1.5 cm. longum, 3-lobatum; *lobi laterales* subacuti, subfalcati; *lobus terminalis* 8 mm. longus, 6 mm. latus, acuminatus, acutus, margine serrulato; *discus* 3-carinatus.

PHILIPPINE ISLANDS: Flowers yellowish white, at 5700 ft. alt. on Mt. Bliss, Province of Misamis, Mindanao, May 25, 1906, *Major E. A. Mearns* & *W. I. Hutchinson* (no. 4727). Specimens in herb. Bureau of Science, Manila, and in herb. Ames.

D. ornithoflorum is a graceful, profusely branched epiphyte of the Grastidium section of the genus Dendrobium, allied with *D. acuminatissimum* Lindl. The younger branches are clothed with the closely appressed tubular sheaths formed by the leaves; the older ones are naked except for the fibrous remains of the withered sheaths at the internodes, are polished yellow, and are rather rigid. From the younger branches the flowers arise in pairs. The peduncle is sheathed at base by a compressed bract. On none of the specimens observed were the flowers open, and it is quite probable that they never widely expand. The median keel on the disc of the labellum extends to the tip of the column foot; near its apex two shorter keels arise, one on each side. All of the keels are somewhat toothed or crenulate near the distal end. Scattered over the upper surface of the labellum minute

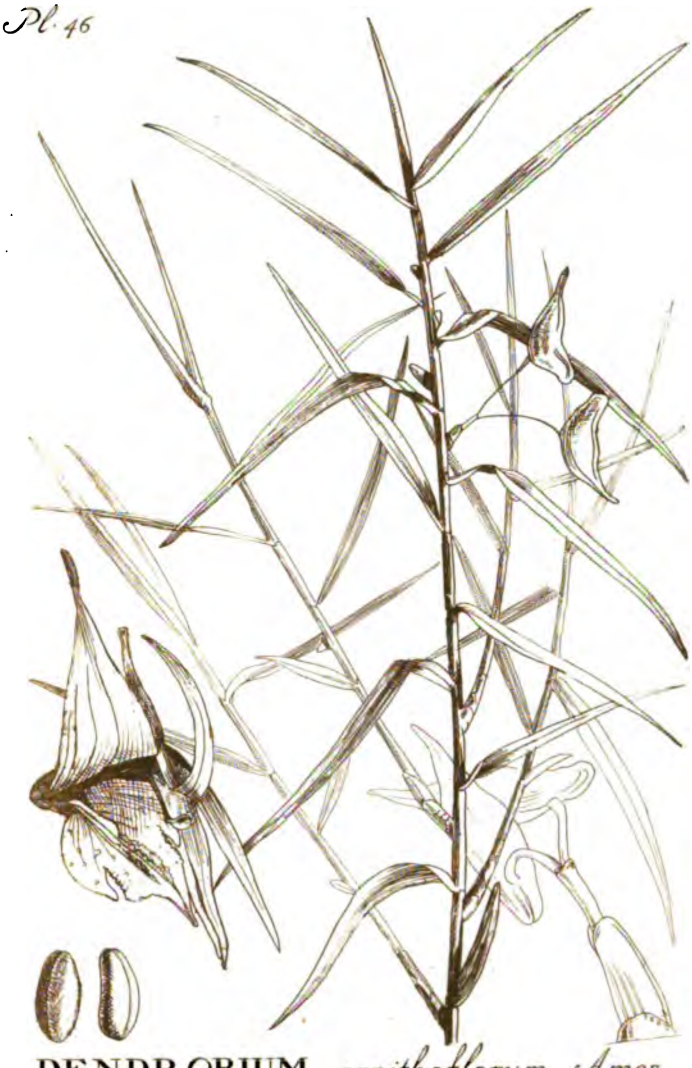
papillæ appear, mainly along the nerves. The specific name alludes to the bird-like aspect of the flowers.

ORCHIDACEÆ

PLATE 46: *Dendrobium ornithoflorum*

Part of a plant, much reduced. In the lower right-hand corner the bract subtending the peduncle is shown, enlarged; in the lower left-hand corner a flower and the pollen masses are represented, enlarged. Behind the labellum of the enlarged flower, a petal and lateral sepal are shown, adherent.

Pl. 46



DENDROBIUM *ornithoflorum Ames*

CESTICHIS HALCONENSIS

Cestichis (§Laxifloræ) **halconensis** Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 321 (1907).

"A very distinct bifoliate species, about 8 dm. high. *Pseudobulbs* about 1.5 cm. long, somewhat cylindrical, covered by 4 or 5 distichous, acute *sheaths* when immature. *Leaves* oblong-lanceolate, very acute, 15–20 cm. or more long, about 3 cm. wide, contracted into a winged *petiole*. *Peduncle* graceful, strongly bialate, exceeding the leaves. *Lowermost bracts* elongated, linear-acute, 1–1.5 cm. long, those of the inflorescence about half as long as the slender pedicels. *Pedicels* of the lowermost flowers 1.5 cm. long. *Inflorescence* loosely many-flowered. *Flowers* grass-green, turning yellow with age. *Lateral sepals* oblong, very obtuse, 5 mm. long, 2 mm. wide. *Upper sepal* similar to the laterals. *Petals* linear, 5 mm. long, about 1 mm. wide. *Labellum* 5.5 mm. long, suborbicular from an oblong-cuneate base; distal margin crenulate and obscurely blunt-mucronate; in the middle of the claw is a fleshy subcucullate *callus*. *Column* 3 mm. long, rather slender, strongly arcuate near the summit."—Ames, *loc. cit.*

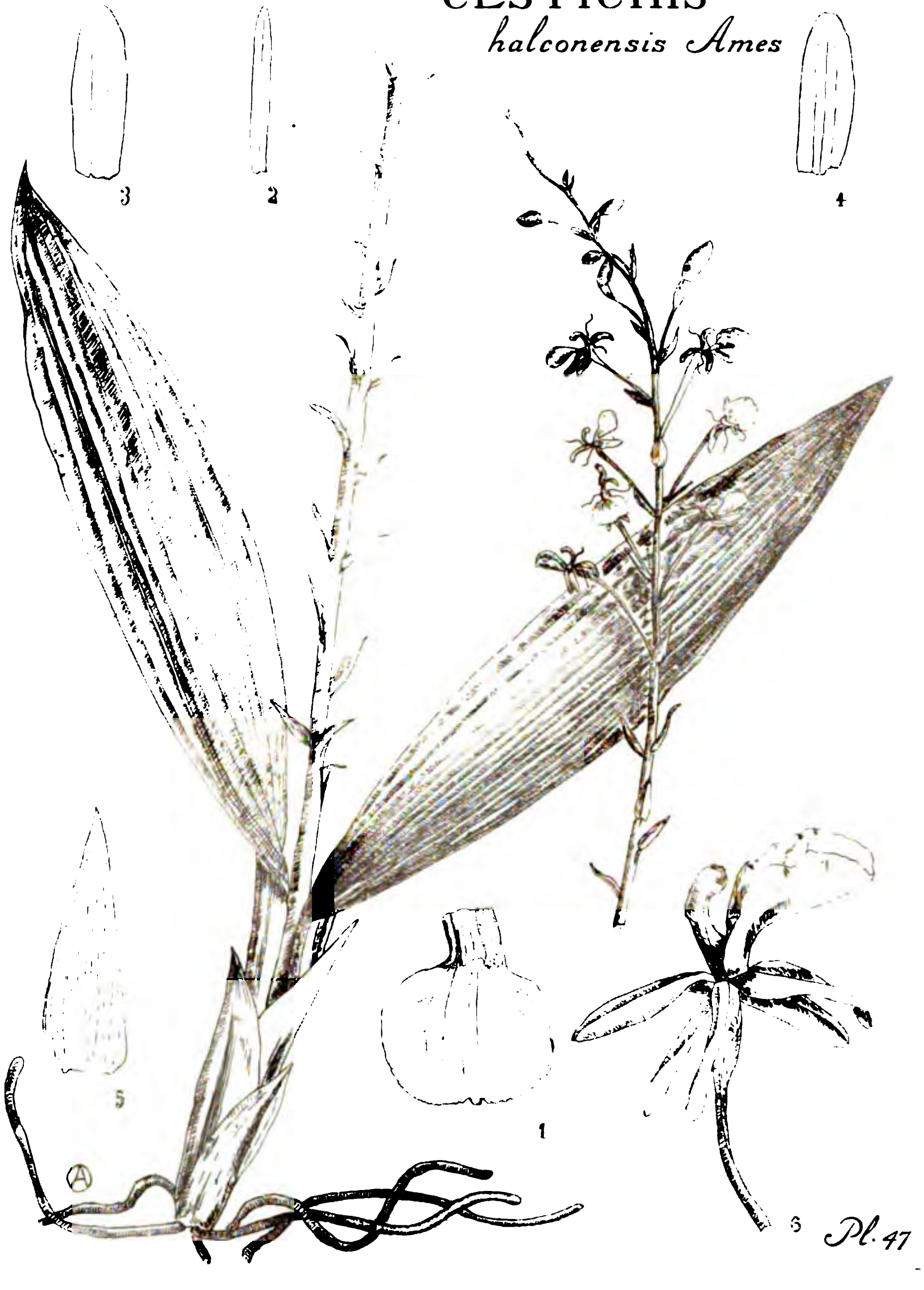
PHILIPPINE ISLANDS: Terrestrial in ridge forest at 1200–2200 ft. alt. on Mt. Halcon, Mindoro, November 8, 1906, *E. D. Merrill* (no. 5799).

PLATE 47: ***Cestichis halconensis***

1, labellum; 2, petal; 3, upper sepal; 4, lateral sepal; 5, floral bract; 6, flower. Flower and parts enlarged, drawn from a co-type with the aid of the camera lucida.

CESTICHIS

halconensis Ames



Pl. 47

OBERONIA McGREGORII

Oberonia McGregorii Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 821 (1907).

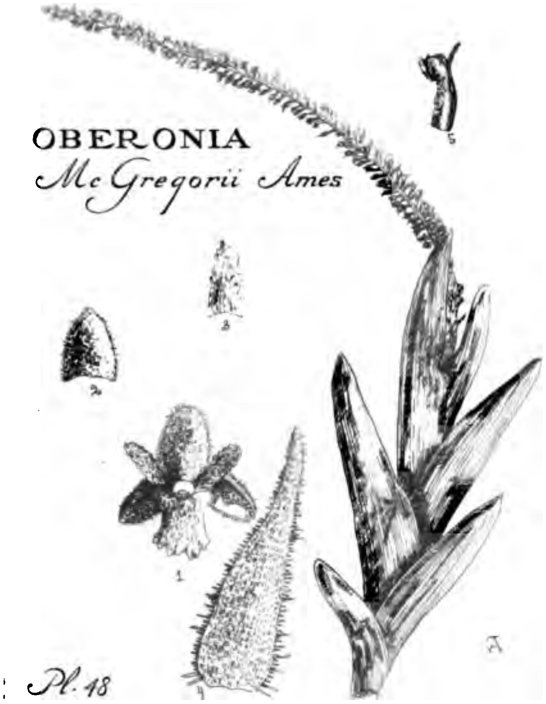
"Closely allied with *O. ciliolata* Hook. f. *Plants* caulescent, when in flower about 12 cm. high from base of stem to tip of the densely flowered cylindrical *spike*. *Leaves* distichous, obliquely spreading from below the middle, ensiform, about 4 cm. long, acute. *Peduncle* relatively stout, bracteate, minutely scurfy-pubescent. *Bracts* linear-lanceolate, acuminate, acute, ciliate-pubescent, about 2 mm. long, exceeding the pedicels of the flowers. *Ovaries* finely pubescent. *Lateral sepals* ovate-lanceolate, or triangular-lanceolate, acute, ciliolate, 0.75 mm. long. *Upper sepal* nearly elliptical, subobtuse, 0.75 mm. long, ciliolate. *Petals* linear-oblong, rounded at the tip, much shorter and narrower than the sepals, minutely ciliolate. *Labellum* pandurate (or oblong, constricted at the middle), coarsely several-toothed at the dilated tip, 0.75 mm. long, slightly auriculate at base."—Ames, *loc. cit.*

PHILIPPINE ISLANDS: Only one specimen seen, found on a prostrate tree, Balete, Baco River, Mindoro, April 23, 1905, *R. C. McGregor* (no. 291).

The accompanying illustration is reproduced from a fragment of the type preserved in my herbarium.

PLATE 48: *Oberonia McGregorii*

1, flower; 2, lateral sepal; 3, petal; 4, floral bract; 5, bud. All parts drawn, enlarged, with the aid of the camera lucida.



OBERONIA
McGregorii Ames

Pl. 48

OBERONIA MINDORENSIS

Oberonia mindorensis Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 322 (1907).

"Allied to *O. Aporophylla* Reichb. f. *Plant* caulescent, 1.5–4 dm. or more tall from base of stem to tip of elongated, slender, densely flowered *spike. Leaves* distichous, 5–10 cm. or more long, acute or subobtuse, obliquely ascending, upper half or two-thirds free. *Spike* 1–2.5 dm. long, about 5 mm. in diameter, somewhat scurfy-pubescent. *Bracts* linear, about 2 mm. long. *Flowers* minute, greenish. *Lateral sepals* elliptic-ovate or ovate, 1 mm. long. *Upper sepal* similar to the laterals. *Petals* linear, obtuse, 0.75 mm. long. *Labellum* 1 mm. long, 3-lobed; *middle lobe* emarginate, about 1 mm. wide; *lateral lobes* not very conspicuous, prolonged slightly behind the column. In general outline the *labellum* is subpanduriform, emarginate, or equally 4-lobed."—Ames, *loc. cit.*

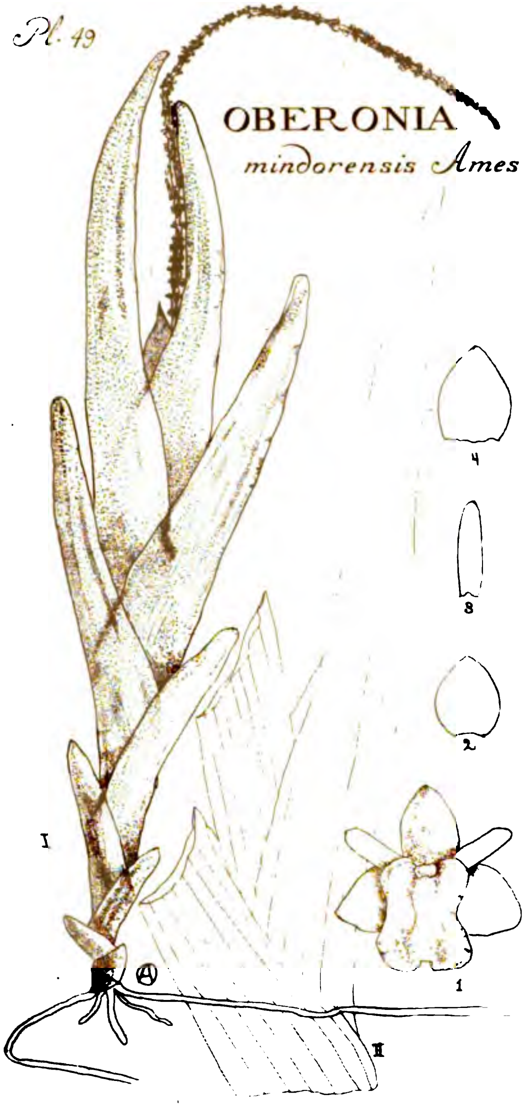
PHILIPPINE ISLANDS: Epiphyte, at 1200 ft. alt., along the Alag River, Mindoro, November, 1906, *E. D. Merrill* (no. 5613).

The illustration is a restoration from a co-type preserved in my herbarium. The flowering plant is representative of one of the smallest of the specimens collected by Merrill, while the leaves in the background exhibit one of the largest.

PLATE 49: ***Oberonia mindorensis***

I. Flowering plant, natural size. II. Fragment of a plant to exhibit range of variation in size. 1, flower; 2, upper sepal; 3, petal; 4, lateral sepal. All parts drawn, enlarged, with the aid of the camera lucida.

Pl. 49


OBERONIA
mindorensis Ames

ANGRÆCUM PHILIPPINENSE

Angræcum philippinense Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 336 (1907); ORCHIDACEÆ, Fasc. II. p. 246 (1908).

Plant 3–6 cm. high. *Roots* very fleshy. *Leaves* elliptic-oblong, obtuse, 2–5.5 cm. long, 0.6–1.4 cm. wide, on contracted *stems*. *Peduncle* fleshy, stout, conspicuously winged, few-flowered, 1.5–4 cm. long. *Bracts* rigid, fleshy, 5 mm. long, conduplicate, triangular, acute. *Pedicels* elongated, about 2.5 cm. long, including the ovary. *Flowers* large, white, odorless. *Lateral sepals* elliptic, rounded and very obtuse at the apex, about 2.2 cm. long, about 1.5 cm. wide. *Upper sepal* similar to the petals, cuneate at base, about 2.2 cm. long, 1.4–1.5 cm. wide. *Petals* broadly spathulate, about 2.2 cm. long, 1.5 cm. wide, very obtuse. *Labellum* 3-lobed; *middle lobe* oblong, rounded at the tip, 9 mm. long, about 7.5 mm. wide; *lateral lobes* somewhat similar to the middle lobe, but shorter, 4–5 mm. long, 6.5 mm. wide at base. *Spur* slender, 3.5 cm. long. *Column* about 7 mm. long, rather stout. *Pollinia* globose with a single *stipe*.

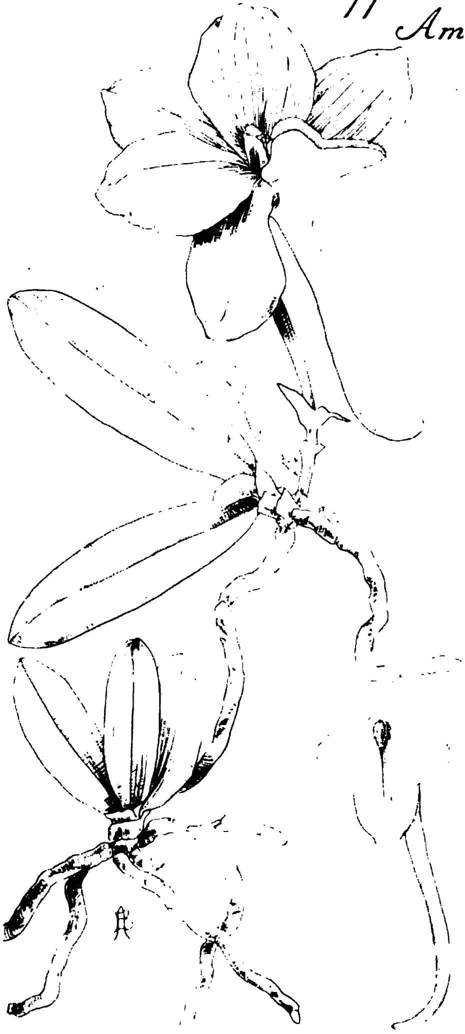
PHILIPPINE ISLANDS: Epiphyte at about 2500 ft. alt. on forested slopes of Mt. Halcon, Mindoro, November 28, 1906, *E. D. Merrill* (no. 5698).

The description given above is, with the exception of several minor changes, taken from the *Philippine Journal of Science.*

Angræcum philippinense is the first species of the genus Angræcum recorded as a native of the Philippine Islands. The flowers are white with a yellow stripe on the labellum, and in relation to the size of the plant which bears them extraordinarily large. When dry they retain their white color and become somewhat translucent. The leaves when dry retain the coriaceous texture characteristic of their fresh state and become extremely rugose. Each of the specimens which constitute the co-type, from which the accompanying plate was prepared, bears about three distichous leaves. In the illustration the vegetative parts were prepared from a co-type in my herbarium and the flower from the type specimen deposited in the herbarium of the Bureau of Science at Manila.

The genus Angræcum of Thouars, as at present understood, is confined to those species which have a single stipe to the pollinia, a character which, according to R. A. Rolfe in Dyer's *Flora of Tropical Africa* (7:133), is the only absolute one by which Angræcum can be separated from the genera allied to it. In Listrostachys Reichb. f., the globose pollinia are situated upon a pair of slender stipes distinct from each other or only united at base, while in Mystacidium Lindl., the pollinia are situated upon a pair of slender stipes which are attached to separate oblong or squamiform glands.

ANGRÆCUM *Philippinense* *Ames*



Pl. 50

ORCHIDACEÆ

PLATE 50: ***Angræcum philippinense***
Plant, natural size. In the right-hand lower corner the labellum and spur are shown.

SPIRANTHES SALTENSIS

Spiranthes saltensis Ames ORCHIDACEÆ, Fasc. II. p. 258 (1908).

The type specimen is destitute of foliage and appears to be hysteranthous. *Plant* about 32 cm. tall, clothed by 6 or more tubular acute rather loosely appressed *bracts*. *Stem* pubescent. *Flowers* 8, large, nodding. *Floral bracts* exceeding the ovary, ovate-lanceolate, acuminate, acute, when dry conspicuously striate-nerved, 1.1–1.8 cm. long. *Ovary* turbinate, pubescent, suberect. *Perianth* strongly deflexed. *Lateral sepals* linear-oblong, acute, 3-nerved, 1.7 cm. long, about 2.5 mm. wide. *Upper sepal* linear-oblong, 3-nerved, 1.8–1.9 cm. long, broader at the base than the lateral sepals. *Petals* falciform, acute, 1.7 cm. long. *Labellum* panduriform, *ecallose*, shortly clawed, somewhat apiculate, 3-nerved, with the lateral nerves branched, 1.7 cm. long.

MEXICO: Collected near El Salto, State of Durango, at 8000–8700 ft. alt., on July 12, 1898, by *E. W. Nelson* (no. 4545).

This very distinct species is nearly allied with *Spiranthes Llaveana* Lindl. It belongs to a puzzling group of plants which appear to form a connecting series between the genera Spiranthes L. C. Rich. and Sauroglossum Lindl. The species of this series are rarely found complete in herbaria on account of the usual absence, during anthesis, of basal leaves, consequently descriptions of the foliage are likely to be wanting. The accompanying plate was prepared from the type specimen in the United States National Herbarium.

S. eriophora Robinson & Greenman, another Mexican species, which is a near ally of *S. saltensis*, is characterized by elongated tubular sheaths which entirely conceal the stem, and by exceptionally long floral bracts which exceed the flowers.

SPIRANTHES *Pl. 51*

Saltensis Ames

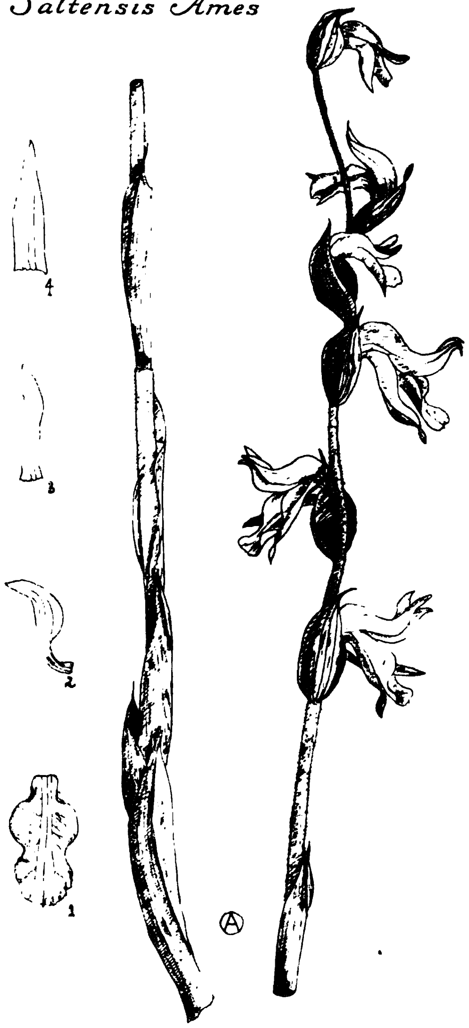


PLATE 51: *Spiranthes saltensis*

1, labellum; 2, petal; 3, lateral sepal; 4, upper sepal. All the parts natural size, the sepals, petal, and labellum having been traced through transparent paper on the stage of a dissecting-microscope.

STELIS GRACILIS

Stelis gracilis Ames ORCHIDACEÆ, Fasc. II. p. 266 (1908).

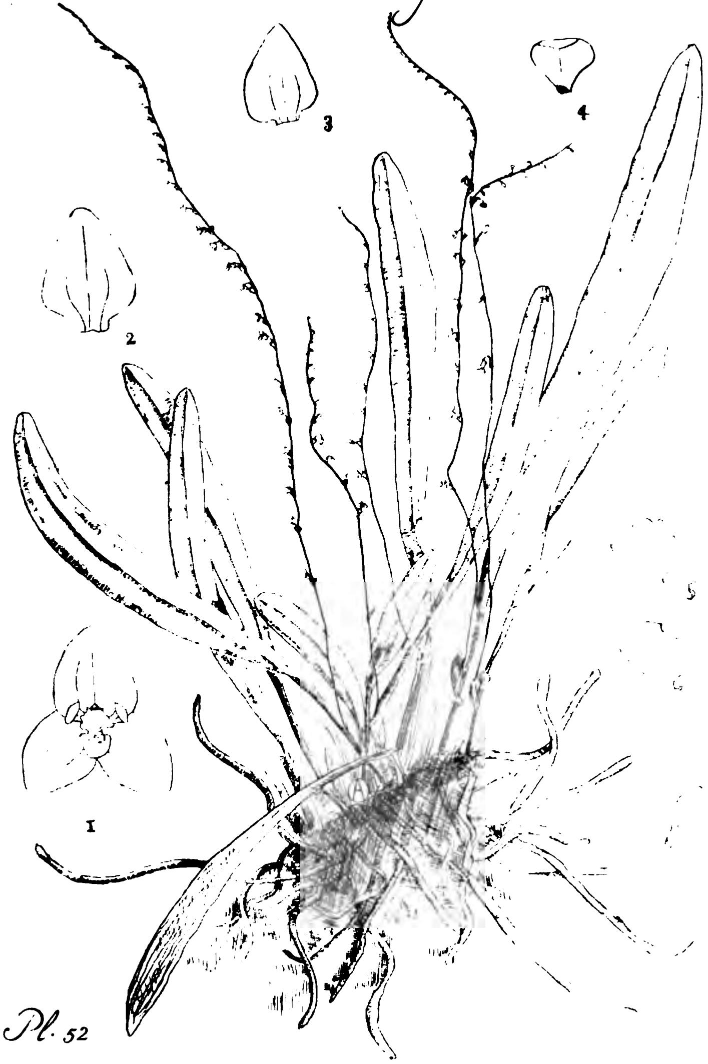
Secondary stems erect or ascending, 2–4 cm. long, clothed by elongated ancipitous obliquely truncate acute *sheaths*, which are conspicuously nervose when dry. *Leaves* coriaceous, linear-oblong, bidentate at the tip, 6–10 cm. long, 7–10 mm. wide above the middle, tapering at base into slender canaliculate *petioles*. *Peduncle* longer than the leaf, 10 cm. long, filiform, graceful, clothed at intervals with tubular obliquely truncate aristate-apiculate *bracts*, about 1 mm. long. *Pedicels* graceful, slender, exceeding the scale-like *floral bracts*. *Flowers* minute. *Sepals* similar, ovate, 3-nerved, 2 mm. long, 1.5 mm. wide. *Petals* cuneate, fleshy, thickened at the apex, about 0.5 mm. long, 1 mm. wide near the tip, 1-nerved. *Labellum* unguiculate, subequal to the petals, at about the middle obscurely bicallose, the *calli* approximate or confluent. *Column* short, the margin dentate.

GUATEMALA: Cubilquitz, Depart. Alta Verapaz, at 350 m. alt., June, 1900, *H. von Tuerckheim* (no. 7681).

In habit *Stelis gracilis* resembles *S. intermedia* Poepp. & Endl. The callus on the labellum appears to be variable and is so minute that its presence is not readily detected.

The genus Stelis, of Swartz, is systematically a most confusing one; consequently it is very inadequately understood and as a rule very poorly represented by carefully determined specimens in herbaria. Until an exhaustive comparative study of all available material has been made it must prove a fruitless task to identify with surety any but the better known and more common species of the genus.

STELIS *gracilis Ames*



Pl. 52

PLATE 52: *Stelis gracilis*

Plant, natural size, reproduced from a part of the type. 1, flower; 2, upper sepal; 3, lateral sepal; 4, petal; 5, column; 6, labellum. All parts drawn, enlarged, with the aid of the camera lucida.

STELIS COMPACTA

Stelis compacta *sp. nov. Planta* pusilla, cæspitosa, ± 2 cm. alta. *Caules secondarii* graciles, ± 5 mm. longi, 1-foliati. *Folium* oblanceolatum, apiculatum, coriaceum, 1–2.7 cm. longum, ± 2 mm. latum, carina prominenti dorsali media. *Pedunculus* gracilis, filiformis, 3 cm. longus, foliis longior. *Bracteæ* tubulares, ad apicem dilatatæ, oblique truncatæ. *Bracteæ inflorescentiæ* squamiformes, pedicellis breviores, apiculatæ. *Sepala lateralia* late ovata, 1 mm. longa, circa 1 mm. lata. *Sepalum dorsale* lateralibus simile sed angustius. *Petala* oblanceolata vel spathulata, obtusa, uninervia, circa 1 mm. longa. *Labellum* crassum, ovato-lanceolatum, acuminatum, obtusum vel subacutum, in alabastro acutum, 1 mm. longum. *Columna* erecta, crassiuscula, apoda, utroque ad apicem ala rotundata. *Pollinia* 2, subglobosa vel pyriformia, minutissima.

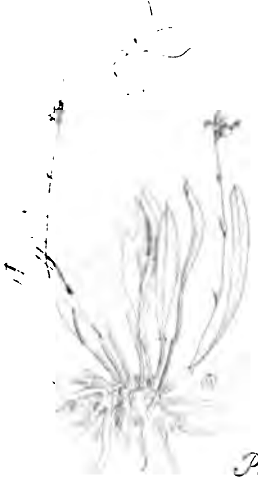
GUATEMALA: Cubilquitz, Depart. Alta Verapaz, at 350 m. alt., May, 1901, *H. von Tuerckheim* (no. 7991).

This compact little plant which, with some hesitation, is here referred to the genus Stelis Swartz, is most nearly allied with *Stelis lancilabris* Reichb. f. (*Beiträge zu einer Orchideenkunde Central-Amerika's*, 94, tab. 8, II. 3–5, 1866), which it closely resembles in habit and with which it agrees in having membranaceous petals devoid of thickening at the apical margin. According to Lindley's tentative classification of the genus in *Folia Orchidacea*, *Stelis compacta* belongs in the section Monostachyæ brachypodæ, although in its floral parts it resembles none of the well-known species of that extremely artificial group. The petals in outline bear no resemblance to the labellum, and in this respect are unusual for the genus. The floral bracts are obliquely truncate and clasp the slender rhachis. The apicules

which terminate the narrow leathery leaves are bristle-like and about 0.5 mm. in length. The type specimen is made up of four well-developed plants and several fragments.

While the generic characters of this plant may have been incorrectly diagnosed on account of its unusual floral conformation, its affinities with the species of Brachionidium Lindl. (a nearly allied genus) are not clear, and its agreement with the generic characters of Pleurothallis R. Brown—a somewhat heterogeneous group—is equivocal. Except for the structure of the column, one might readily place the plant in Brachionidium on the strength of the brief characterization published by Lindley in *Folia Orchidacea.* For the present, at least, I prefer to place it in the genus Stelis because of its agreement with Reichenbach's *Stelis lancilabris* and its lack of agreement with any of the species known to me in the other genera mentioned. As R. A. Rolfe has stated (*Memoirs of the Torrey Botanical Club,* 4: 261), the groups designated by Lindley as the Monostachyæ and Polystachyæ cannot be retained, as the traits which distinguish them are not constant even for the same species.

STELIS *compacta* Ames



Pl. 53

ERYTHRODES MERRILLII

Erythrodes Merrillii *comb. nov.*—*Herpysma Merrillii* Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 313 (1907).

Plant 1–3 dm. high. *Rhizome* creeping. *Leaves* about 5, ovate-lanceolate, shortly acuminate, acute, rounded at the base, 5–7 cm. long, about 3 cm. wide, passing into slender *petioles.* Base of the *petioles* scarious, sheathing the stem. *Peduncle* sparsely pubescent, with about 3 lanceolate scarious about 1 cm. long *bracts* below the loose racemose *inflorescence. Floral bracts* linear-lanceolate, acute, scarious, about 1 cm. long. *Flowers* white. *Lateral sepals* linear-oblong, about 1.2 cm. long, 2 mm. wide, concave, lightly carinate, cucullate with several hairs at the tip. *Upper sepal* similar to the laterals, broader, adhering lightly to the petals. *Petals* 1.2 cm. long, spathulate, obtuse, linear below the middle, free from each other at the base, cohering above the middle by their inner margins. *Labellum* adhering to the column, produced at base into a rather slender *spur,* which is bilobed at the tip and which protrudes between the lateral sepals; free portion narrow, a little dilated beyond the column, then 4-lobed; *proximal lobes* divaricate, oblong, obtuse, 1.5 mm. long, 1 mm. wide, separated from the distal lobes by a short 1 mm. long *claw* or isthmus; *distal lobes* divaricate, 1.5 mm. long, about 2 mm. wide, margin irregular; on the disc two thin longitudinal *lamellæ,* free at the obliquely truncate apex. Two wart-like *calli* are situated in the spur near its base, on the dorsal wall. From tip of spur to apex of labellum 1.5 cm.

PHILIPPINE ISLANDS: Terrestrial in damp ravine, by small stream on Mt. Halcon, Mindoro, November 9, 1906, *E. D. Merrill* (no. 5836).

Since the publication of the original description of this species further studies into its generic characters have convinced me that it is more properly a species of Erythrodes Blume, than of Herpysma Lindl., differing from all the other species of the former genus, of which I have any knowledge, in the lamellæ of the labellum and in the two wart-like excrescences within the didymous sac or spur. Herpysma, it is true, has a bilamellate labellum, which, as in Erythrodes, is adherent to the gynostemium, but all the other characters of the species under consideration indicate clear affinity with the latter genus.

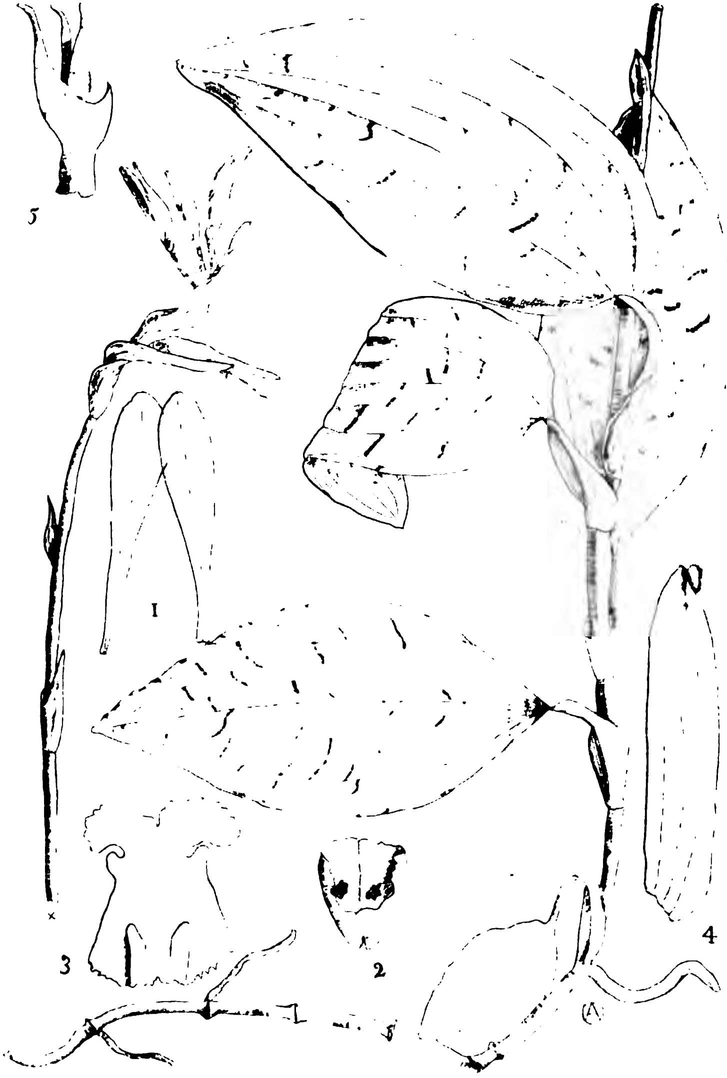
As now understood Erythrodes receives the Old World species placed by some authors in Physurus L. C. Rich. There is a marked difference between these genera, and it seems desirable to restrict Physurus to the western hemisphere (at least until a more decided agreement between it and Erythrodes is discovered), on the basis that geographical limits, when accompanied by strongly pronounced structural differences, are quite reliable in the differentiation of genera.

In *Nachträge zur Flora der deutschen Schutzgebiete in der Südsee* (Schumann & Lauterbach), Dr. Rudolf Schlechter discusses briefly the relationship between Erythrodes and Physurus, and in conformity with his views places in Erythrodes the following species: *Physurus bracteatus* Blume, *P. Blumei* Lindl., *P. viridiflorus* Lindl., and *P. Henryi* Rolfe; and he describes and figures two new species from Kaiser-Wilhelmsland, namely, *Erythrodes papuana* and *E. purpurascens.* J. J. Smith in *Bulletin du Departement de l'Agriculture aux Indes Néerlandaises*, in his first supplement to *Die Orchideen von Java*, agrees with Schlechter's views and places the Javan *Physurus humilis* Blume in Erythrodes. The didymous sac or spur of the labellum of the Old World species is a constant differentiating character, according to Schlechter's studies never occurring in the species of Physurus of the New World. Furthermore, the gynostemium is supposed to offer important differentiating characters, although these are more or less relative in value and consequently of questionable worth in a systematic arrangement of species in such a puzzling group as the Physureæ. In both the Spirantheæ and Physureæ the dangers to a stable system of classification from excessive segregation of genera are very great. Even the most careful disposition of species in genera may be severely disturbed by morphological exceptions. Whether or not convenience is subserved by the multiplication of genera in such groups as the Spirantheæ and Physureæ, it is often quite evident that affinities are frequently neglected.

PLATE 54: *Erythrodes Merrillii*

Plant, natural size. 1, petals; 2, basal portion of the labellum showing the didymous tip of the spur; 3, apical portion of the labellum, showing the tips of the lamellæ; 4, lateral sepal; 5, column. All parts drawn, enlarged, from a co-type with the aid of the camera lucida.

ERYTHRODES *Merrillii Ames* × *Pl. 54*



NEPHELAPHYLLUM MINDORENSE

Nephelaphyllum mindorense Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 316 (1907).

"Closely allied to *N. pulchrum* Blume. *Plants* about 2 dm. tall. *Rhizome* creeping, slender, rooting at intervals. *Stems* purple. *Leaves* with the under surface uniformly dark purple, upper surface mottled, ovate-lanceolate, acuminate, acute, 8–10 cm. long, 3–5.5 cm. wide near the base. *Petioles* relatively slender, about 3 cm. long. *Peduncles* exceeding the leaves, clothed with several scarious tubular acute *sheaths*. *Inflorescence* loosely few-flowered. *Bracts* about 1 cm. long, linear, acute, scarious, somewhat shorter than the pedicels of the white *flowers*. *Lateral sepals* linear, acute, 1-nerved, 9 mm. long, 1.5 mm. wide. *Upper sepal* similar and equal to the laterals. *Petals* oblong, acute, slightly broader above than below the middle, 1-nerved, about 8 mm. long, 3 mm. wide. *Labellum* suborbicular, entire, 9–10 mm. long, 9–10 mm. wide, with 3 prominent converging *lamellæ* near the apex, which pass basally into the main nerves of the hairy *disc*. *Spur* blunt, inflated, 4–5 mm. long."—Ames, *loc. cit.*

PHILIPPINE ISLANDS: Terrestrial in humid forest at about 900 ft. alt. along the Binabay River, Mindoro, November 2, 1906, *E. D. Merrill* (no. 5623).

PLATE 55: *Nephelaphyllum mindorense*

Plant, natural size, drawn from a co-type in herb. Ames. 1, flower; 2, upper sepal; 3, lateral sepal; 4, petal. In fig. 1 the labellum is shown with its converging lamellæ and blunt spur. All parts drawn, enlarged, with the aid of the camera lucida.

NEPHELAPHYLLUM

mindorense Ames

Pl. 55

ORCHIDACE

ERIA HALCONENSIS

Eria (§Trichotosia) **halconensis** Ames in *Philipp. Journ. Sci.* (*Bot.*) 2: 330 (1907).

"*Plant* comparatively slender, about 5 dm. tall. *Stems* about 7 mm. in diameter near the base, tapering gradually upwards. *Leaves* linear-lanceolate, acuminate, acute, pubescent, about 1 dm. long, 7–11 mm. wide. *Racemes* leaf-opposed, shorter than the leaves, about 5 cm. long, somewhat flexuose, densely covered with reddish yellow hairs. *Bracts* broadly ovate or suborbicular, 4–6 mm. long, hairy, abruptly acuminate. *Lateral sepals* triangular, externally hairy, subacute, 7 mm. long, about 4 mm. wide at base. *Upper sepal* oblong, externally hairy. *Petals* linear, subspathulate, tapering to a subacute or subobtuse apex, 6 mm. long, 1.5 mm. wide. *Labellum* 7 mm. long, linear-cuneate at the base, dilated above, then constricted within 2 mm. of the tip, 3-lobed; *lateral lobes* minute, obtuse, formed by the constriction; *middle lobe* subquadrate, apiculate, 3–4 mm. wide; *disc* with a prominent mid-nerve. *Mentum* about 3 mm. long."—Ames, *loc. cit.*

PHILIPPINE ISLANDS: Epiphyte, flowers pink-purple, on exposed ridge at 4500 ft. alt. on Mt. Halcon, Mindoro, November 14, 1906, *E. D. Merrill* (no. 5742).—Terrestrial, flowers pink-purple, odorless, on banks in mossy forest at 6000 ft. alt. on Mt. Halcon, Mindoro, November 15, 1906, *E. D. Merrill* (no. 5510) type.

In addition to the type, which was collected on November 15, Merrill discovered a series of specimens which exhibit slight differences from *Eria halconensis*. This series was referred to *E. halconensis* in my paper on Merrill's Mt. Halcon orchids,* although the original description was drawn entirely from the type. The plants of the series in question are smaller throughout than typical *E. halconensis*, one specimen in my herbarium being only 23 cm. high, with narrow leaves 4.5 to 7.5 cm. long and with flowers 7 mm. long from the tip of the blunt mentum to the tips of the lateral sepals. The differences in the floral conformation between the two series are too slight to warrant specific or even varietal distinction, and as the variation in foliage, though great, is not uncommonly wide for species of the Trichotosia section of the genus Eria, I have refrained from placing upon it undue reliance.

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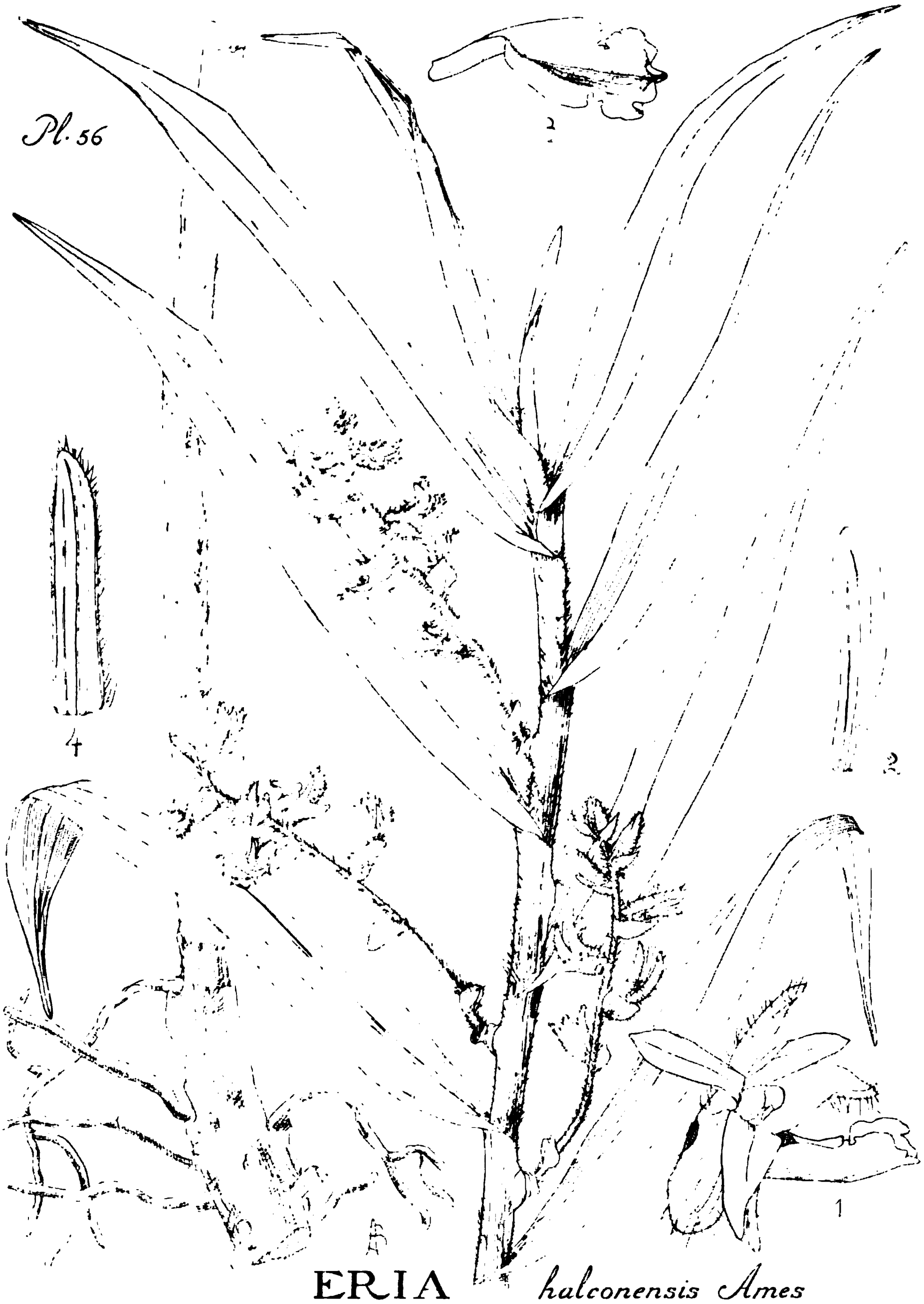
* *Philippine Journal of Science* (*Bot.*) 2: 330 (1907).

Pl. 56



ERIA *halconensis Ames*

PLATE 56: *Eria halconensis*

Plant, natural size, drawn from a co-type (*Merrill*, no. 5510). 1, flower; 2, petal; 3, labellum; 4, upper sepal. All parts drawn, enlarged, with the aid of the camera lucida.

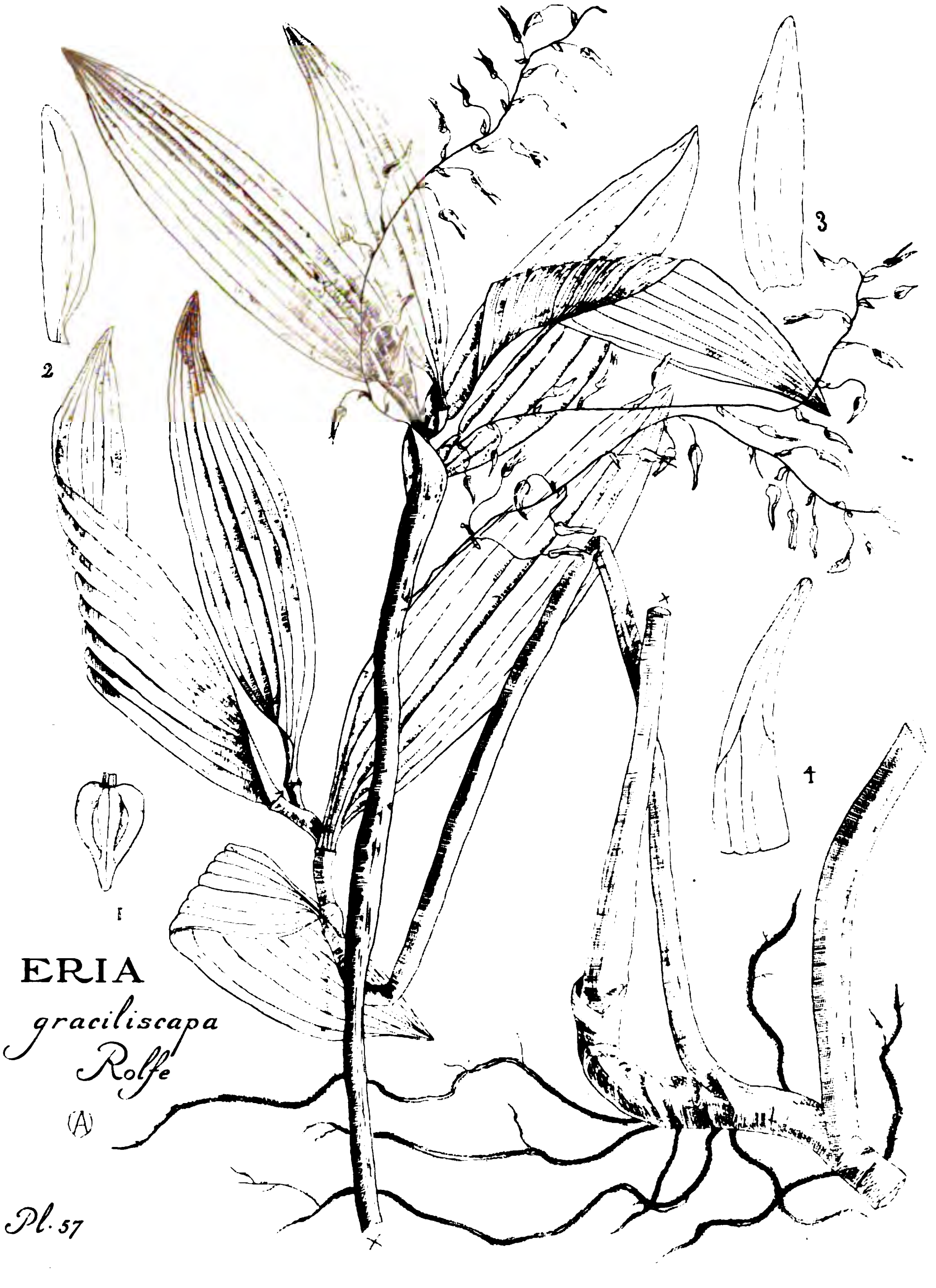
ERIA GRACILISCAPA

Eria (§Hymeneria) graciliscapa Rolfe ex Ames ORCHIDACEÆ, Fasc. I. p. 93 (1905) and Fasc. II. p. 193 (1908).

Roots copiously branched, finely hairy. Stems slender, terete, 11.5–19 cm. long, sheathed by several tubular acute *bracts*. *Leaves* 3–4, terminal, oblong-lanceolate, acute, nervose, scarcely petiolate, 6–8.5 cm. long, 1.2–1.9 cm. wide. *Peduncles* axillary near the summit of the stem, slender, many-flowered, 6–7 cm. long. *Bracts* lanceolate, acute, scarious (in dried specimens), ±2 mm. long. *Flowers* white. *Lateral sepals* 5 mm. long, 1 mm. wide, linear-lanceolate to oblong-lanceolate, subacute or obtuse, 3-nerved. *Upper sepal* similar to the laterals. *Petals* linear-lanceolate, obtuse, subfalcate, about 3 mm. long. *Labellum* entire, about 2 mm. long, ovate-lanceolate to lanceolate, 3-nerved, the lateral nerves carinate. *Column* rather stout, about 1 mm. long.

PHILIPPINE ISLANDS: On Mt. Mariveles, Prov. of Bataan, Luzon, May, 1904, *H. N. Whitford* (no. 307).—Near the same locality it was collected on May 22, 1904, by *D. LeRoy Topping* (no. 474), and on May 25, 1904, by *Thomas E. Borden* (no. 795). Borden reports that his specimens bore white, fragrant flowers and were gathered on mountain ridges at 1150 m. above sea level.

In aspect *E. graciliscapa* recalls *E. tenuifolia* Ridley, a species which has narrower leaves and broader floral segments. Whitford says of the type that it was found both epiphytic and on the ground, 3000 feet above sea level.



ERIA
graciliscapa
Rolfe
(A)

Pl. 57

PLATE 57: *Eria graciliscapa*

Plant, natural size, drawn from the co-type in herb. Ames. 1, labellum; 2, petal; 3, upper sepal; 4, lateral sepal, the margin rolled in. All the parts, much enlarged, drawn with the aid of the camera lucida.

H. obtusata NEW YORK

North woods, August 17, 1879, *Lester F. Ward* (2).—In a balsam swamp, St. Regis Falls, June 10, 1903, *E. R. Hodson* (no. 19) (2).

Franklin Co.: West of Upper Saranac Lake, July 1, 1899, *Rowlee, Wiegand & Hastings* (3).

Essex Co.: Adirondacks, August 10, 1877, *Addison Brown* (8).—Upper flank of Whiteface Mt., Adirondacks, July 22, 1870, *J. H. Redfield* (4).

Herkimer Co.: North woods, *J. A. Paine* (3).

MICHIGAN, Isle Royale

Deep moist woods, July, 1889, *J. H. Sandberg* (1, 5).

Keweenaw Co.: Keweenaw Point, 1863, *Dr. Robbins* (4).—Woods, July, 1888, *O. A. Farwell* (no. 515) (3).—Low ground, Clifton, August, 1884, *F. E. Wood* (2).—June, 1886, *Farwell* (no. 515) (11).

Marquette Co.: In swamps of Coniferæ, Turin, June 24, 1901, *Bronson Barlow* (2).—Marquette, July 9, 1883, *G. F. A.* (2); 1863, Hb. Canby (16).

Chippewa Co.: Sault de Ste. Marie, July, 1865, *T. C. Porter* (16).

Mackinac Co.: Mackinac, July 4, 1879, *Thos. E. Boyce* (1).

Cheboygan Co.: July 13, 1890, *H. C. Beardslee* (1, 5); cedar swamp, July 10, 1890, *Beardslee & Kofoid* (4).

Emmett Co.: Cedar swamp, Little Traverse Bay, August 3, 1897, *C. W. Fallass* (5).

WISCONSIN

Door, July 27, 1887, *J. H. Schuette* (1).

Oneida Co.: Mossy woods, borders of Spirit Lake, June 19, 1898, *S. C. Wadmond* (5).

MINNESOTA

Shoot Line Park, July, 1889, *F. F. Wood* (no. 171) (2).

Lake Co.: Two Harbors, July, 1891, *J. H. Sandberg* (no. 467) (2).

St. Louis Co.: With Moneses, Mud Lake, Vermillion Lake, July 24, 1886, *J. C. Arthur, L. H. Bailey, Jr., & E. W. D. Holway* (no. B 380) (3).

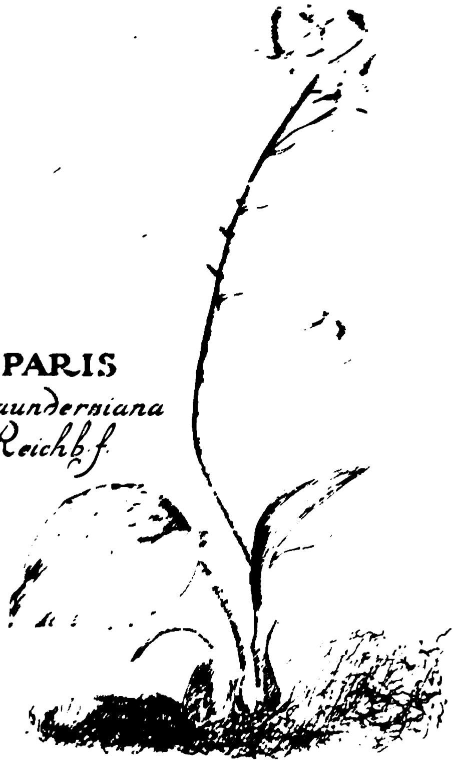
Beltrami Co.: Bogs, Itaska Lake, June 26, 1891, *Sandberg* (no. 1054) (8).

Wright Co.: Rich woods, Silver Creek, August 29, 1891, *Sandberg* (no. 911) (2).

MONTANA, Flathead County

Columbia Falls, July 6, 1895, *R. S. Williams* (no. 628) (5).

Meagher Co.: Clendenin, Belt Mts., July 3, 1889, *Williams* (no. 628) (2).



LIPARIS
Saundersiana
Reichb.f.

Pl 38

PLATE 58: *Liparis Saundersiana*

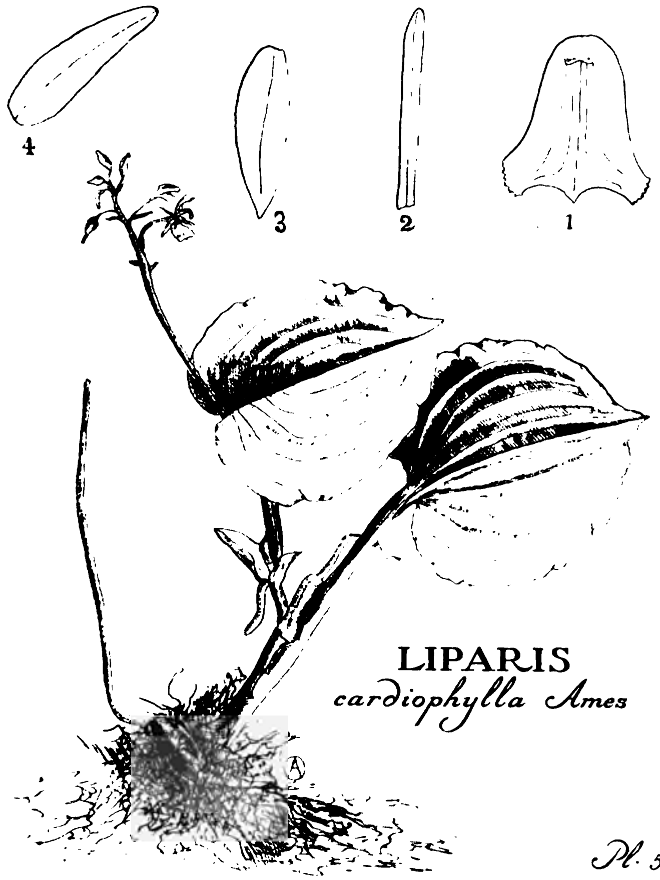
Plant, natural size, drawn from a specimen collected in January by William Harris. 1, petal; 2, upper sepal; 3, lateral sepal. On the right, a flower drawn natural size.

LIPARIS CARDIOPHYLLA

Liparis cardiophylla *sp. nov.* Aff. *L. neuroglossæ* Reichb. f. et *L. ramosæ* Poepp. & Endl. *Rhizoma* repens. *Pseudobulbi* cylindrati, 8 mm. longi. *Folium* erectum; *lamina* ovato-cordata vel suborbiculata, apiculata, membranacea, 2.5–3.9 cm. longa, 2.3–3.3 cm. lata, multinervia; *petiolus* ad basim vaginans, 2–2.5 cm. longus. *Pedunculus* alatus, ±5 cm. longus, cum racemo folia excedens. *Bracteæ* lanceolatæ, acutæ, ±2.5 mm. longæ. *Racemus* pauciflorus, laxiflorus. *Sepala lateralia* membranacea, 4 mm. longa, oblonga, uninervia. *Sepalum dorsale* simile. *Petala* linearia, membranacea, 4–5 mm. longa. *Labellum* 3.5 mm. longum, 3.5 mm. latum ad apicem, membranaceum, cuneato-flabellatum, retuso-apiculatum vel bilobatum; *lobi* truncati marginibus irregulariter dentatis; ad basim prope columnam *callus* incrassatus, cucullatus. *Columna* 2.5 mm. longa, ex comparatione crassa.

Plant small, monophyllous. *Pseudobulb* minute, sheathed by the petiole of the ovate-cordate or suborbicular apiculate *leaf. Peduncle* strongly winged, comparatively stout, bearing about ten flowers. The *flowers* appear to have been greenish when fresh, with five purple nerves in the *labellum. Liparis cardiophylla* is closely allied to *L. neuroglossa* Reichb. f., a Bolivian species, to *L. ramosa* Poepp. & Endl. as indicated above, and to *L. elegantula* Kränzl., a bifoliate species, native of Peru.

JAMAICA: John Crow Peak, at 6000 ft. alt., January 12, 1907, *Wm. Harris* (no. 9784). Type in herb. Ames (no. 10529).



LIPARIS
cardiophylla Ames

Pl. 59

PLATE 59: *Liparis cardiophylla*

Plant, natural size, drawn from the type. 1, labellum; 2, petal; 3, lateral sepal; 4, upper sepal. All parts drawn, enlarged, with the aid of the camera lucida.

A SUMMARY OF NEW SPECIES AND COMBINATIONS PROPOSED IN THIS FASCICLE

NOTE. *The figures refer to page numbers*

Dendrochilum rhombophorum (*Reichb. f.*) *n. comb.*	**7**
Dendrochilum Foxworthyi *sp. nov.*	**8**
Dendrochilum Loheri *sp. nov.*	**12**
Dendrochilum anfractoides *sp. nov.*	**13**
Dendrochilum Curranii *sp. nov.*	**15**
Dendrobium ornithoflorum *sp. nov.*	**60**
Stelis compacta *sp. nov.*	**76**
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Liparis cardiophylla *sp. nov.*	**92**

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SOUTH CAROLINA, Richland County

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Aiken Co.: Aiken, August 27, 1866, *W. Ravenell* (4).

Berkeley Co.: Summerville, August, 1893, *J. B.* (5).

Beaufort Co.: Beaufort district, 1886, *Dr. Mellichamp* (10).—Bluffton, 1873, *Mellichamp* (16).

GEORGIA, Dodge County

Moist pine barrens, Eastman, August 7, 1901 (Biltmore no. 4887g) (5).

Sumter Co.: Moist pine barrens, July 26, 1901, *Roland M. Harper* (no. 1122) (2, 3, 4).

Thomas Co.: Thomasville, August 4–14, 1903, *Mrs. A. P. Taylor* (1); July 18, 1905, *Mrs. Taylor* (1).

FLORIDA

Chapman (2, 4, 5, 8, 16).

Duval Co.: August, 1876, *A. H. Curtiss* (7).—Moist pine barrens near Jacksonville, August, 1877, *Curtiss* (no. 2758) (2, 4, 6, 8); August 6, 1894, *Curtiss* (no. 5120) (14).—San Pablo, July 25, 1896, *L. H. Lighthipe* (no. 440) (5).

Madison Co.: Damp, dark, fertile hammock woods near a pond, August 2, 1898, *Combs* (2).

Gadsden Co.: Quincy, September 4, 1895, *Geo. V. Nash* (no. 2560) (2, 3, 4).

Washington Co.: Swamps, Point Washington, August 10, 1901 (Biltmore no. 4887f) (5).

St. John Co.: St. Augustine, 1877, *Mary C. Reynolds* (8).

Hernando Co.: June–July, 1898, *A. S. Hitchcock* (4).

Orange Co.: Oviedo, July, 1904, *T. L. Mead* (1).—Sanford, July 29, 1895, *Nash* (no. 2274) (10).

ALABAMA, Cullman County

Cullman, August 5, 1896, *Chas. Mohr* (12).

Tuscaloosa Co.: Low grassy pine barrens, June, *E. A. Smith* (12).—Wet soil, Tuscaloosa, August 1, 1899 (Biltmore no. 4887b) (5).

Clay Co.: August 24, 1897, *F. S. Earle* (14).

LEE Co.: Auburn, August 11, 1897, *F. S. Earle & C. F. Baker* (no. 789) (4, 14). *H. cristata*

BUTLER Co.: In swamps near Greenville, August 11, 1899 (Biltmore no. 4887c) (5).

MOBILE Co.: Mobile, 1872, *Wm. Harvey* (no. 39) (2); July 21, 1905, *W. C. Dukes* (1).—Common in swamp, Spring Mill, August 1, 1897, *B. F. Bush* (no. 87) (2, 4).

MISSISSIPPI, HARRISON COUNTY

Biloxi, July 26, 1896, *C. L. Pollard* (no. 1038) (2, 3, 4, 5).—July 29, 1899, *S. M. Tracy* (no. 5080) (5).—July 23, 1897, *C. F. Baker* (14).

HANCOCK Co.: July 28, 1887, *H. V. Arnx* (4).

TENNESSEE, PUTNAM COUNTY

Swampy ground, August 8, 1900 (Biltmore no. 4887e) (5).

COFFEE Co.: Tullahoma, August, 1878, *Dr. A. Gattinger* (7).

FRANKLIN Co.: Sewanee, August 1, 1878, *Gattinger* (8).

ARKANSAS, PULASKI COUNTY

Little Rock, July, 1885 (11).

LOUISIANA

Hale (3).—Paroisse des Rapides, 1839, *Prof. Steinhauer* (4).—Aldenbridge, November 1, 1898, *Wm. Trelease* (4).

× **H. Chapmanii** (*Small*) comb. nov. (*H. ciliaris* × *H. cristata*). × *H. Chapmanii*

Blephariglottis Chapmanii *Small*, Fl. Se. U. S. 314 (1903).

"Roots coarse; stems 6–10 dm. tall: leaves few; blades broadly linear to linear-lanceolate, 1–2 dm. long or shorter above, acute, the lower ones with clasping bases, the upper reduced to sessile bracts: spikes cylindric, about 1 dm. long, 4 cm. thick, many-flowered: perianth deep orange: sepals about 4 mm. long, the lateral suborbicular, the other concave, often notched at the apex: lateral petals fan-shaped, 3.5–4 mm. long, pectinate-fringed: lip about 1 cm. long, the body linear, with a terminal drooping fringe of 6–8 simple or forking hair-like appendages and 2 basal stag-horn-like forking appendages: spur as long as the ovary or longer.

× *H. Chapmanii* “In pine woods, Apalachicola, Florida, Summer.” Small, *loc. cit.*

FLORIDA, Franklin County

Low pine woods near Apalachicola, 1868, *Dr. Saurman* (4, 5); *Chapman* (5); 1882, *Chapman* (3).

Duval Co.: Moist pine barrens near Jacksonville, August, *A. H. Curtiss* (no. 2758) (3); August 6, 1894, *Curtiss* (no. 5120) (2).

H. ciliaris 26. **H. ciliaris** (*L.*) *R. Br.*, Prodr. 312 (1810), in Ait. Hort. Kew. ed. 2, 5: 194 (1813), Miscellaneous Bot. 2: 477; *Sims*, Bot. Mag. t. 1668 (1814); *Lindl.*, in Donn’s Hort. Cant. ed. 10, 332 (1823); *Torr.*, Comp. 317 (1826); *Spreng.*, Syst. Veg. 3: 690 (1826); *Lodd.*, Bot. Cab. t. 1826 (1832); *Short*, Cat. Ky. 7 (1833); *Beck*, Bot. ed. 1, 348 (1833); *Gray*, in Ann. Lyc. Nat. Hist. N. Y. 3: 230 (1836); *Darl.*, Fl. Cestr. ed. 1, 507 (1837); *Eaton & Wr.*, N. A. Bot. ed. 8, 259 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Dewey*, Herbaceous Pl. Mass. 198 (1840); *Darby*, Bot. S. St. 526 (1866); *Gray*, Man. ed. 5, 502 (1867), ed. 6, 509 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 408 (1895); *Willis*, Cat. N. J. 61 (1874); Yale Cat. 45 (1878); *J. Robinson*, Fl. Essex Co. 108 (1880); Gard. Chron. n. s. 14: 305 (1880); *Ward*, Fl. Wash. 119 (1881); *Britton*, Prel. Cat. N. J. 94 (1881); *Perkins*, Gen. Cat. Vt. 37 (1882); *Galen*, Fl. Lanc. Co. (1884), (1895), 15 (1898); *Gattinger*, Tenn. Fl. 83 (1887); *Macoun*, Cat. 4: 18 (1888); *Dame & Collins*, Fl. Middlesex 103 (1888); *Bennett*, Pl. R. I. 43 (1888); *Perkins*, Fl. Vt. 278 (1888); *Britton*, Cat. N. J. 234 (1889); *Macoun*, Check-list 53 (1889); *Watson*, Orch. Cult. ed. 1, 527 (1890), ed. 2, 527 (1895); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Morong*, in Bull. Torr. Bot. Cl. 20: 36 (1893); *Williams*, Orch. Grow. Man. ed. 7, 417 (1894); *Baldw.*, Orch. N. Eng. 90, 113–115, f. 35 (1894);

Moran, in Journ. des Orch. 6: 254 (1895); *Britton & Br.*, Ill. Fl. 1: 464, f. 1167 (1896); *Millsp. & Nutt.*, Fl. W. Va. 200 (1896); *Kearney*, in Bail. Cycl. Am. Hort. 2: 706, f. 1015 (1900); *Meehan*, Monthly 10: 17, t. 2 (1900); *Gattinger*, Fl. Tenn. 62 (1901); *Mohr*, Pl. Life Ala. 454 (1901); *Mathews*, Field-book 88, fig. (1902); *Jelliffe*, Gibson's Nat. Orch. 47, t. 23 & frontisp. (1905); *Harper*, in Rho. 7: 73 (1905). *H. ciliaris*

Orchis Marilandica, grandis & procera, floribus luteis, calcari longissimo, labello fimbriato *Ray*, Suppl. 588 (1704). —**O. palmata elegans lutea Virginiana cum longis calcaribus luteis** *Mor.*, Hist. 3: 499 (1715).—**O. nectarii labio lanceolato ciliato, seta germine intorto longiore** *Roy.*, Lugdb. 15 (1729).—**O. bulbis indivisis, nectarii labio lanceolato ciliato cornu longissimo** *L.*, in Act. Ups. 6 (1741).

Orchis ciliaris *L.*, Sp. Pl. ed. 1, 939 (1753) (excl. syn. *Gron.*, Fl. Virg.), ed. 2, 1331 (1763); *Forst.*, Cat. Pl. N. A. 39 (1771); *Walt.*, Fl. Carol. 280 (1788); *Muhl.*, Ind. Fl. Lanc. 178 (1793); *Salisb.*, Prodr. 6 (1796); *Poir.*, in Lam. Encyc. 4: 588 (1797); *Andrews*, Bot. Repos. 1: 42, t. 42 (1797); *Sw.*, in Act. Holm. 21: 206 (1800); *Willd.*, Sp. Pl. 4: 8 (1805); *Sw.*, Gen. et Sp. Orch. (Schrader's Neues Journ. 1) 8 (1806); *Pers.*, Syn. 2: 502 (1807); *Martyn*, in Mill. Dict. ed. 9, 2: no. 14 (1807); *Pursh*, Fl. 2: 585 (1814); *Green*, Cat. N. Y. 120 (1814); *Barton*, Comp. Fl. Phil. 2: 136 (1818); *Nutt.*, Gen. 2: 188 (1818); *Torr.*, Cat. N. Y. 68 (1819); *Elliott*, Sketch 2: 483 (1824); *Big.*, Fl. Bost. ed. 2, 319 (1824), ed. 3, 341 (1840); *Eaton*, Man. ed. 4, 374 (1824); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 41, 534 (1856); *Provanch.*, Fl. Canad. 2: 567 (1862).—**O. Floridana, flore aureo fimbriato longis calcaribus donato** *Pluk.*, Amalth. ed. 2, 162, t. 432, f. 5 (1769).

Platanthera ciliaris *Lindl.*, Gen. & Sp. Orch. 292 (1835);

H. ciliaris *Hook.*, Fl. Bor. Am. 2: 199 (1839); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Torr.*, Fl. N. Y. 2: 277 (1843); *Gray*, Man. ed. 1, 471 (1848), ed. 2, 446 (1856), ed. 3, 446 (1859); *Darl.*, Fl. Cestr. ed. 3, 311 (1853); *Beck*, Bot. ed. 2, 348 (1856); *Chapm.*, Fl. S. U. S. ed. 1, 460 (1860), ed. 2, 460 (1884), ed. 3, 486 (1897); *Tatnall*, Cat. Pl. Newc. Co. Del. 75 (1860); *Wood*, Class-book 684 (1861); *Paine*, Pl. Oneida Co. 84 (1865); *Wood & McCarthy*, Wilmington Fl. 50 (1887); *Correvon*, Orch. Rust. 168, f. 32 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 604 (1899).

Blephariglottis flaviflora *Raf.*, Fl. Tellur. 2: 38 (1836).—**B. ciliaris** *Rydb.*, in Britton's Man. 296 (1901); *Burnham*, in Torreya 1: 119 (1901); *Small*, in Porter's Fl. Pa. 93 (1903), Fl. Se. U. S. 314 (1903); *House*, in Torreya 3: 52 (1903); *Lighthipe*, in Torreya 3: 80 (1903).

"ORCHIS bulbis indivisis, nectarii labio lanceolato ciliato: cornu longissimo. *Act. ups.* 1741. *p.* 6.

"Orchis nectarii labio lanceolato ciliato, seta germine intorto longiore. *Roy. lugdb.* 15. *Gron. virg.* 183.

"Orchis palmata elegans lutea americana, cum longis calcaribus luteis. *Moris. hist.* 3, *p.* 499.

"Orchis marilandica grandis & procera, floribus luteis, calcari longissimo: lobulo fimbriato. *Raj. suppl.* 588.

"*Habitat in* Virginia, Canada. ♃." L. *loc. cit.*

In Catesby's Herbarium, preserved at the British Museum of Natural History, there is a very good specimen of this species together with two other specimens of the genus, probably *H. nivea* and *H. repens.* In the Gronovian Herbarium there is a specimen which has been identified as *Habenaria ciliaris* R. Br., accompanied by the following description: "*Orchis nectarii labio lanceolato ciliato, seta germine intorto longiore.*" Probably Gronovius confused two species in his work on the flora of Virginia.

H. ciliaris

H. ciliaris is very rare in the northernmost part of its range. With the exception of one collection from Vermont, which I refer to *H. ciliaris* with reasonable sureness, the species has not been reported from the United States north of Massachusetts. In the southernmost part of its range great variation may be expected, especially in the size of the raceme and the fringe of the labellum.

ONTARIO, Essex County

Low sandy woods, Leamington, August 15, 1886, *Burgess* (6); in a swamp west of Leamington, July 24 and 25, 1892, *J. Macoun* (3, 6).

VERMONT, Orleans County

Troy, 1841, *John Carey* (4).

MASSACHUSETTS, Middlesex County

Lexington, 1852, *W. Boot* (3).

Norfolk Co.: Dedham, August, 1888, *E. H. Hitchings* (3).—West Dedham, August 9, 1888, *Faxon* (2).

Nantucket Co.: Nantucket, August 1897, *L. L. Dame* (3).

RHODE ISLAND, Washington County

South Kingston, August 26, 1880, *Faxon* (3); August 24, 1881, *Faxon* (3); July 27, 1878, *J. W. Congdon* (4).

Providence Co.: Damp woods, Burrillville, September, 1902, *Leland J. Spalding* (17).—Foster, August, 1878, *Dennis Tonery* (1).

CONNECTICUT, New Haven County

New Haven, August, 1830, *S. B. Buckley* (4).—East Haven, near New Haven, July 31, 1886, *A. L. Winton* (3); open swamp, rare, August 15, 1903, *E. B. Harger* (1); August, *H. M. Denslow* (2).—Branford, August 2, 1897, *Wm. Trelease* (4).

Fairfield Co.: Dry rich field, abundant locally, August 22, 1895, *E. H. Eames* (2).—Dry copse on coast, Stratford, September 27, 1903, *Eames* (1).

NEW YORK

Sartwell (3).

Washington Co.: East Greenwich, 1865, *Dr. Asa Fitch* (11).

Seneca Co.: North of Newton's Pond, Junius, August 4, 1893, *Jos. Schrenk* (4).

H. ciliaris Richmond Co.: South Beach, Staten Isl., August 3, 1890, *Mrs. E. G. Britton* (6).—Erastina, July 25, 1894, *C. L. Pollard* (2).

NEW JERSEY

Swamps, July, 1863, *Wm. M. Canby* (6).—August, 1842, *Thos. P. James* (2).—*Thurber* (3).—*Durand* (3).

Hudson Co.: *Circa Hoboken in Canada, lecta 1828*, *C. J. Moser* (10).

Camden Co.: Low ground, July 30, 1871, *C. F. Parker* (3).

Gloucester Co.: Harrisonville, August, 1874, *H. H. Rusby* (10).

PENNSYLVANIA, Center County

Mt. Eagle, July, 1895, *Miss C.* (4).—Bear Meadows, August, 1865, *Miss N. J. Davis* (2).

Huntington Co.: August 14, 1856, *T. C. Porter* (3).

Berks Co.: Monterey, August, 1891, *K. A. Taylor* (2).

Lebanon Co.: Vicinity of Penryn, July 29, 1889, *J. K. Small* (6); September 13, 1892, *A. A. Heller* (no. 680) (2, 4).

Bucks Co.: Low ground, Bristol, July 30, 1865, *C. F. Parker* (2, 4, 5).

Philadelphia Co.: August, 1847, *Thos. P. James* (2).

DELAWARE

Swamps, July, 1863, *Wm. M. Canby* (6).

Newcastle Co.: Swamps, Townsend, August, 1862, *Canby* (16).

MARYLAND, Baltimore County

Near Baltimore, September, 1893, *Adam Steitz* (2); fruit, October 11, 1894, *Steitz* (2).—Near Hill's, fruit, South Baltimore, November 4, 1893 *Steitz* (2); July 25, 1896, *Steitz* (2).

Prince George Co.: Laurel, August 7, 1897, *F. H. Knowlton* (2, 5).

Worcester Co.: Meadows, Ocean City, August 8, 1878, *Wm. M. Canby* (16).

DISTRICT OF COLUMBIA

July, 1887, *C. D. White* (2); August 8, 1897, *Thos. H. Kearney, Jr.* (5).—Mucky ground, August 6 and 12, 1896, *E. S. Steele* (3, 4).—Near Reform School, July 21, 1878, *Lester F. Ward* (2).—Kenilworth Swamp, August 4, 1897, *Steele* (2).—August 8, 1897, *Kearney* (5, 14).—Benning's, August 15, 1897, *C. L. Pollard* (2).

VIRGINIA

Dry hills, mountains of Virginia, August, 1858, *Wm. M. Canby* (16).

Augusta Co.: Mt. Roger, 2000–4473 ft., August 9, 1893, *A. A. Heller & E. Gertrude Halback* (no. 1139) (2).

H. ciliaris

Craig Co.: Craig's, 600 metres, August 22, 1903, *E. S. Steele & Mrs. Steele* (no. 75) (3, 4).

Nansemond Co.: About Suffolk, July 24, 1893, *Heller* (no. 1139) (3).

NORTH CAROLINA

Middle North Carolina, *W. W. Ashe* (2); August 14, 1884, *G. McCarthy* (2); 1885, *McCarthy* (2).

Watauga Co.: Blowing Rock, August 9, 1893, *Mrs. B. L. Robinson* (3).

Buncombe Co.: Moist woodland, Biltmore, August 5, 1896 (Biltmore no. 489) (5); dry woods, August 13, 1897 (Biltmore no. 489b) (2, 3, 4, 5).

Cleveland Co.: Base of King's Mt., August 1, 1902 (Biltmore no. 489e) (5).

Polk Co.: Spring Mountain Park, near Columbus, August 16, 1897, *E. C. Townsend* (2).

Swain Co.: Dry hillsides, Great Smoky Mts., 1700–4000 ft., July 15–August 15, 1891, *Beardslee & Kofoid* (2, 4).

Henderson Co.: Flat Rock, *L. Gibbs* (3).—Swamps of Muddy Creek, August 20, 1881, *J. D. Smith* (3).

New Hanover Co.: Wilmington, 1881, *W. R. Smith* (2).

SOUTH CAROLINA, Lexington County

Moist soil, Batesburg, July 30, 1900 (Biltmore no. 489d) (5).

Aiken Co.: Aiken, August, 1869, *H. W. R[avenell]* (2); August 16, 1866, *H. W. R.* (4).

Beaufort Co.: Bluffton, 1872, *Dr. Mellichamp* (4); 1873, *Mellichamp* (16).

GEORGIA, Floyd County

Rome, July, 1888, *Gerald McCarthy* (2).

Richmond Co.: Augusta, August, 1876, *A. Cuthbert* (10).

Screven Co.: Scarborough, September, 1884, *E. W. Lang* (10).

Sumter Co.: Rather dry pine barrens, July 24, 1901, *R. M. Harper* (no. 1108) (2, 3, 4).

Worth Co.: Poulan, August 14 and 15, 1900, *C. L. Pollard & W. R. Maxon* (no. 552) (2).

Colquitt Co.: Sphagnous bog along Ochlocknee Creek, near Moultrie, August 22, 1903, *R. M. Harper* (no. 1943) (1).

Thomas Co.: Thomasville, August 21, 1897, *S. M. Tracy* (no. 3535) (2, 4, 14); July 6, 1902, August 4, 25, September 1, 1903, July 18, 1905, *Mrs. A. P. Taylor* (1).

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ORCHIDACEÆ

IV

ORCHIDACEÆ

ILLUSTRATIONS AND STUDIES OF THE FAMILY ORCHIDACEÆ

ISSUED FROM THE AMES BOTANICAL LABORATORY
NORTH EASTON, MASSACHUSETTS

⁂

THE GENUS HABENARIA IN NORTH AMERICA

BY
OAKES AMES
DIRECTOR OF THE BOTANIC GARDEN OF HARVARD UNIVERSITY

WITH TWENTY ETCHINGS BY
BLANCHE AMES

Fascicle IV

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THESE PAGES
WHICH I HAD HOPED
TO DEDICATE
TO
ALVAH AUGUSTUS EATON
ARE NOW INSCRIBED
TO
HIS MEMORY

PREFACE

THE present work owes its origin to a long-felt need for a comprehensive treatise devoted to the genus Habenaria in North America. It was begun ten years ago in the form of a card catalogue devoted to every species native of the United States and Canada. As the work progressed the absolute necessity of an acquaintance with types became apparent, and in 1905 an effort was made to consult all the material that had a bearing on the subject.

Visits were made to the foremost European herbaria, and loans secured of all the large collections in the United States. From my own herbarium a representative series of specimens was selected for comparison with type material, and from this series individuals were sought for which matched the types in detail. This method not only necessitated close scrutiny of every character, but rendered the specimen ultimately chosen exceptionally valuable for future reference.

In addition to descriptive notes and suggestive sketches, a clear photograph was made of specimens which promised to be of service in the preparation of a monograph. In this work I was assisted by R. G. Leavitt and A. A. Eaton.

In the interpretation of species I have avoided the tendency of some botanists to recognize subspecies as worthy of specific rank. Many years of experience with cultivated orchids, during which slight variations in structure or color were assiduously sought for among thousands of individuals, has convinced me that caution should be exercised in the segregation of species, and that there is danger of rendering the whole structure of systematic botany unwieldy by an inordinate multiplication of slightly differentiated species. Everyone who has paid close attention to cultivated orchids must realize that while slight distinctions are very serviceable for horticultural uses, they are impracticable for the purposes of systematic botany. Undoubtedly many of these horticultural forms will breed true to type and thus act like species. But should they be given specific rank the orchid flora of the world would be increased tenfold.

Several Habenarias are characterized by a strong tendency to produce variations. The temptation to recognize these variations as distinct species may be strong, but I think the best interests of the science are subserved by regarding them as the components of compound species. Slightly modified, the Linnæan conception of a species forms a convenient basis for systematic work. For economic purposes the subspecies is necessary. When it is propagated from pure cultures and carefully labelled, it is of undoubted value.

The greatest difficulties in the present monograph were experienced among recent segregates. In my treatment of these I may have reduced some which further studies of fresh material will reinstate, but at present they appear to be exceptional forms unworthy of specific rank. In several of these segregates the distinguishing characteristics may be found in the flowers of one inflorescence, so that a single specimen will exhibit the floral peculiarities of two described species. Then again, the vegetative characters in the group to which *Habenaria hyperborea* and *H. saccata* belong are extremely variable and unsafe criteria for specific distinction.

In 1904 I made special efforts to obtain in a fresh state, from several localities, large collections of *H. hyperborea* and *H. dilatata.* The specimens were taken from different kinds of soil, from sunny and shady places, and the range of variation was represented as completely as possible. The conclusions based on this material convinced me that it is futile to attempt to distinguish centres of variation, or to recognize such species as *Habenaria fragrans*, *Platanthera huronensis*, and *P. graminea*.

The influence of environment is too frequently ignored by those who pay special attention to slight deviations from the condition represented by the type. *Habenaria hyperborea* and *H. dilatata*, which were originally described from plants collected in northern localities, are extremely variable in their vegetative organs. From the characteristic dwarf state met with in the extreme northern part of the range, to the slender or robust tall state common southward, every gradation for a complete series may be found. This fact, in conjunction with the information offered by Gaston Bonnier, is very significant.[1] Bonnier experimented with single individuals which he divided into two. One part of the original plant was grown on the Alps or Pyrenees, the other on low land. In a short time the alpine half assumed the familiar dwarf habit of alpine plants. For an example of the difference between the two halves of a plant treated in this manner, *Helianthemum vulgare* should be consulted in the illustrations of Bonnier's paper.

In the "Evolution of the Orchidaceæ," in the *Orchid Review* (February, 1910), R. A. Rolfe treats the Habenaria group under two subtribes, namely, Gymnadenieæ and Habenarieæ, the former having one and the latter two distinct stigmas. He says that Platanthera and Gymnadenia are sometimes united with Habenaria, an arrangement which makes of Habenaria one great chaotic aggregate whose characters cannot be defined with any degree of precision. This statement leads to the conclusion that the characters on which the three genera depend for purposes of classification are not sufficiently clear to allow subgeneric characterization under Habenaria. This conclusion is palpably incorrect, as the basis on which systematists have relied who have upheld the disjunction of Habenaria is the distinctness of these characters. This basis hardly leads to chaos whether adopted or rejected, although it does not simplify classification, as I have attempted to show.

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[1] *Ann. Sci. Nat.*, 7 Ser., t. 20.

The greater part of the type material of North American Habenaria species is to be found in European herbaria. Fortunately the specimens are usually well preserved and serviceable for the purposes of monographic work. The authors of early botanical books, however, were not always precise in designating the exact specimens which formed the basis of their conclusions, so that in many cases it is not possible to discover what may be the type. As a rule their collections do not contain many representatives of a species, and then it is a simple matter to arrive at a decision by a process of elimination. Notwithstanding the extensive correspondence of Linnæus and the number of contributors to his herbarium, it is noteworthy that the few species of North American Habenarias which he possessed are with one or two exceptions represented by a single example.

For the student of the native species of the United States the herbaria of the British Museum of Natural History and of the Royal Botanic Gardens at Kew contain rich collections of critical specimens. But both of these herbaria lack extensive series of the forms of a given species.

Of the oldest collections containing American Habenarias those of Gronovius and Walter, preserved in the British Museum, are of special interest. The latter, which is bound in book form, contains only a few specimens of critical value.

Of more modern collections Lindley's occupies a unique position. Here again the different species are represented by only a few specimens, and it is comparatively easy to pick out the types or individuals of importance. Lindley's practice of drawing the flowers on his mounting-paper constitutes a great aid in the examination of his types, but unfortunately many of his interpretations are faulty and should never be final. A glaring example of this is the drawing on the type sheet of *Habenaria novemfida*, to which I have referred under *H. diffusa.* In this case Lindley drew and described petals as trifid which subsequent examination by Dr. Prain proved to be bifid.

American herbaria are indispensable in any serious work on Habenaria, and among these the Gray Herbarium of Harvard University is of incomparable value. In this collection there are numerous types, cotypes, and duplicates of type numbers.

The collections in the Museum d'Histoire Naturelle de Paris are of special worth in a study of Mexican species, particularly those described by Richard in the *Annals de Science Naturelle.* Richard prepared careful drawings of many of his new species, and of these the greater part has been reproduced in this work. The almost total neglect of Richard's types by subsequent authors is inexplicable, and to American botanists the placid disregard of his material by Europeans must prove an unending source of surprise.

In the following monograph I have attempted to assemble all the known species of Habenaria which have been attributed to North America. In almost every case I have included the original descriptions. The arrangement of the species tends to show their affinities, although clearness has not been sacrificed in favor of a purely natural sequence.

Special attention has been given to bibliography and geographical distribution. These are of importance in showing the extent of the investigations from which conclusions have been may appear a month later than the title-page of each number indicates.

Harms's list of genera, which will be retained regardless of priority, while its purpose is admirable, proves rather conclusively that absolute priority is undesirable. This list leans, perhaps, toward the rule that good botanical work shall not be undone by the laborious process of seeking for antiquated names in obscure volumes. But it does not go far enough, and leaves out of consideration the names of species which have been in common use for many years. Once we begin to tumble down the structure built on good botanical work, and on the rule that upholds the first correct combination under the proper genus, we open the way to confusion.

Since the geographical distribution of *Habenaria hyperborea* was prepared, several specimens preserved in the Public Museum, Milwaukee, have been examined. These specimens are the only ones from Wisconsin which I have seen.

Botanic Garden of Harvard University
March, 1910

ORCHIDACEÆ

ORCHIDACEÆ

⁂

THE GENUS HABENARIA IN NORTH AMERICA

INTRODUCTION

THE genus Habenaria has undergone a series of changes at the hands of those botanists who have given it special attention until at the present time it is an arduous task to comprehend its rational limits. No two systematists agree in their revisions; and while some have considered the treatment in Bentham and Hooker's *Genera Plantarum* too broad, including as it does the recognized groups of many authors under one general heading, namely, Habenaria, others have not been content to reëstablish as genera such subgeneric groups as Gymnadenia, Platanthera, Peristylus and Cœloglossum, but have made segregates from several of them. Although there may be excellent reasons both for and against the maintenance of Habenaria in the sense in which it was understood by the authors of the *Genera Plantarum*, the weight of authority seems to uphold the broader view. So eminent a student of the Orchidaceæ as Lindley expressed grave doubts as to the validity of the characters on which he admitted as distinct groups Gymnadenia and Peristylus in his *Genera and Species of Orchidaceous Plants*. In fact it is usually with apologies, doubts, or detailed explanations that authors accept the smaller groups which have been at one time or another put into or removed from Habenaria.

It is futile to discuss what are sufficient characters on which to construct a genus, as personal opinion is largely influential and as systematists are not in absolute agreement. While a concurrence of opinion may be found in regard to several particular genera, a variance of opinion will exist as to others. Each systematist is likely to attribute to some character a value which his associates fail to recognize. Abstractly there seems to be general agreement among botanists as to the value of classificatory groups, although they differ so considerably in the application of their rules. In his discussion of the classifications used by botanists and zoölogists Herbert Spencer has said that "when aggregating the smallest groups into larger groups and these into groups still larger, they have adopted certain general terms expressive of the successively more comprehensive divisions; and the habitual use of these terms, needful for purposes of convenience, has lead to the tacit assumption that they answer to actualities in Nature. It has been taken for granted that species, genera, orders, and classes, are assemblages of definite values—that every genus is the equivalent of every other genus in respect of its degree of distinctness; and that orders are separated by lines of demarcation which are as broad in one place as another. Though this conviction is not a formulated one, the disputes continually occurring among naturalists on the questions, whether such and such organisms are specifically or generically distinct, and whether this or that peculiarity is or is not of ordinal importance, imply that the conviction is entertained even where not avowed."[1] Furthermore, the same author says that "it is a wholly gratuitous assumption that organisms admit of being placed in groups of equivalent values." And according to the present status of systematic botany this is undoubtedly true, and necessarily so, as the same viewpoint can scarcely be held in regard to all classes of organisms, and as characters which in one family or tribe would appear of generic value would hardly appear so in another.

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[1] *The Principles of Biology.*

Characters which are to serve for generic distinction are not infrequently chosen with total disregard of specific forms throughout a wide range, and this is most likely to take place in the segregations made from amphigean genera which comprise numerous polymorphic species. In a localized flora made up in great part of vagrants which have become introduced into a country from distant, geographically distinct regions, those systematists who lack opportunity to study in large herbaria where general and fairly complete representations are to be had of the flora of adjacent territory, and who confine themselves to the plants of special geographical regions, are inclined to establish genera on characters which a broad knowledge of a given group would clearly show were scarcely of generic weight.

In southern Florida, for example, we find a remarkable orchid flora largely made up of West Indian immigrants. Here the genus Epidendrum is represented by about ten species, belonging to at least six very distinct sections as follows: Epicladium, Encyclium, Hormidium, Osmophytum, Amphiglottium, and Euepidendrum. With their few representatives these sections might well be regarded as distinct genera,[1] and would appear as six very natural groups if no other species outside of Florida were known. Here too a noteworthy occurrence would perhaps justify a still broader treatment, as the single species representing in Florida the section Osmophytum has three well developed anthers and is unknown in its normal state in this region. If the components of this triandrous race were recognized, on the basis of the gynœcium, as constituting a distinct genus, we would then have a species which had changed its generic or even its tribal character, while its specific characters remained unaltered.[1] In other words it would differ only from its West Indian congener in respect to the anthers. That this aberration should be maintained as a variety[2] is clear evidence that in the interpretation of structural deviations, natural affinities when they are clear and self-evident are not to be strained.

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[1] Hormidium is so recognized.

The Habenarias of Florida on the other hand are few. Those species which belong to the Ophrydinæ-Habenarieæ of Pfitzer form two fairly distinct sections. One of these sections is represented by a single species, namely, *Habenaria odontopetala* which was originally described as a native of Mexico and which is also known to inhabit the West Indies. This species has been placed in a new genus, described by Dr. J. K. Small as Habenella, and characterized by structural peculiarities of the flower. It is but one species of a small American group, nearly related to *Habenaria strictissima* and *H. eustachya*, and differs from other Floridian Habenarias in little else except the unappendaged petals and undivided labellum; yet its affinity with those species which have divided petals and a three-parted lip is very evident, as at the base both petals and lip have rudimentary processes.

In striking contrast to the treatment of the genus Habenaria which allows the segregation of *Habenaria odontopetala* we have Sir J. D. Hooker's in the *Flora of British India.* "I accept Bentham's view," he writes, "that the genera which he has brought under it [Habenaria] cannot be separated from one another by natural or artificial characters. To these *Herminium* should be added, were it not for the consequent disturbance of much nomenclature and the multiplication of synonyms; and so should also be *Diplomeris* and *Hemipilia*, which, though they have recognizable differential characters, these are of less importance than those of the four last sections here adopted" (namely, Plectoglossa, Diphylax, Diphyla and Dithrix).

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[1] See T. H. Morgan, *Evolution and Adaptation*, p. 90.

[2] In a recent publication this anomalous Epidendrum has been raised to specific rank.

Almost of the same opinion are King and Pantling, who in the *Orchids of the Sikkim-Himalaya* give the following note in which they refer to Habenaria as—

"A genus which should certainly be reduced to the older Linnæan genus *Herminium* were it not for the upsetting of synonymy which this would involve. The older genus consists of about 18 species. *Habenaria* contains about 400! Moreover the distinctions between *Habenaria* and *Orchis* are also mostly arbitrary; and were mere consistency the only object, *Orchis* (a genus of Tournefort) would swallow up not only *Herminium* and *Habenaria*, but also *Diplomeris* and *Hemipilia*."

Cogniaux has supported in his work on the orchids of Brazil[1] the view taken by Bentham, as is indicated by the very full synonymy which he gives under Habenaria, and is at variance with the system adopted by Pfitzer in Engler and Prantl's *Die natürlichen Pflanzenfamilien*. Pfitzer, not only admits such genera as Cœloglossum, Gymnadenia, Platanthera and Perularia, but separates these from Habenaria, and places them in a separate section, the reason for the division depending mainly on the development of the stigmas.

We might expect to find in Lindley's work a rational interpretation of the Habenarieæ, as his prolonged study of the orchid family must have placed him on intimate terms with a large number of species. According to the views expressed by him in his *Genera and Species of Orchidaceous Plants* he was of the opinion that Habenaria as generally understood included several clearly marked genera. We find him arguing in a circle, however, and must conclude that he was by no means confident

[1] In *Martii Fl. Bras.*

in his deductions. Under Platanthera he wrote, in reference to the recognition by Robert Brown of a section based on the anthers: "The genus has to depend upon another distinction, to which I can discover no exception, namely, to the absence of the fleshy processes of the lower lip of the stigma. Otherwise *Platanthera* is the same as *Habenaria*." Yet in his discussion of Gymnadenia we find the following, which in conjunction with his remarks on Platanthera is of more than casual interest: "It is scarcely possible to find any very precise limits between this genus and Platanthera.... Even the stigmatic processes of *Habenaria* and its allies are to be remarked in almost every species of *Gymnadenia;* only in most cases in adhesion with the stigma itself." If we examine the distribution of species among the several genera Lindley admitted in his work, we shall find inconsistencies, the most astonishing being those where he places the same species in two genera. The difficulties under which he worked may excuse such slips, but at the same time it is quite pardonable to use this example to illustrate the dangers into which fine distinctions may lead, and as an argument against segregation of genera based on trivial or obscure characters.[1]

Among the subgenera of Habenaria which have the best claims for recognition, if we are to rely on the authority of Lindley, Pfitzer and Kränzlin, Gymnadenia, Platanthera, Peristylus and Cœloglossum occupy an important place. If we study these genera, not as convenient categories, but as systematic groups and examine carefully the species distributed among them, the first incongruous discovery will be the lack of agreement as to what species they should contain. This diversity is of a nature to discourage any effort to uphold a single one of these genera. While Lindley, Pfitzer and Kränzlin agree that Gymnadenia and Platanthera should be upheld, these authors are not in accord as to many of the species which should be referred to them!

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[1] It is of interest to note that Kränzlin refers to the synonyms of *Platanthera fuscescens* the following species which Lindley regarded distinct from each other: *Platanthera herbiola, Peristylus virescens, Perularia flava.*

The species which Lindley included in Cœloglossum, Kränzlin places in Peristylus, Platanthera and Euhabenaria. He also refers to Orchis, Peristylus and Platanthera, species included by Lindley in Gymnadenia. Pfitzer, on the other hand, throws Peristylus into Platanthera. *Habenaria viridis* is placed in Peristylus by Lindley, in Platanthera by Kränzlin, and in Cœloglossum by Pfitzer. Pfitzer gives Cœloglossum as a monotypic genus, Lindley placed five species in it, and Kränzlin abandoned it altogether in his *Orchidacearum Genera et Species.* Pfitzer upholds Perularia, Kränzlin reduces it to Platanthera. Numerous similar examples of disagreement could be cited to show the slender claim for recognition of Gymnadenia, Platanthera, Peristylus and Cœloglossum. It is at least reasonable to assume that genera which are so poorly differentiated that the same species may be referred to several of them by careful students of the orchid family are scarcely tenable in a rational and convenient system of classification.

We are indebted for the most recent revision of a part of the genus Habenaria as represented in North America north of Mexico to Dr. P. A. Rydberg of the New York Botanical Gardens. Dr. Rydberg has gone farther than any other author of modern times in the splitting up of the genus, and has given us several new segregate genera. He is not at all in sympathy with the conservatism of Bentham and Hooker, Torrey, Gray, Cogniaux and others, and is much opposed to the maintenance of large groups which in any way may be divided. An illustration of what I mean may be obtained from Britton's *Manual of the*

Flora of the Northern States and Canada, for which Dr. Rydberg prepared a revision of the Orchidaceæ. In this work eighteen species are admitted which were formerly included by Gray, and Britton and Brown, in the genus Habenaria. Dr. Rydberg has distributed these species among seven genera, of which three by him are newly established. The characters on which he relies for the distinctiveness of these genera are not clearly drawn, so that it is difficult to discuss their claim for recognition, and in his key he makes use of differences which would seem to be rather specific than generic.

Perfect agreement as to the final treatment of Habenaria is hardly to be expected, but it is a fair question to ask if the reasons which influenced Bentham, Gray and Torrey are not as valid to-day as they were thirty years ago, and if, on the whole, they were not pretty good reasons. Furthermore, it is fair to ask if the host of species described since 1840 has thrown new light on the subject which makes invalid the reasoning of Bentham in the *Journal of the Linnæan Society.* With regard to Bentham's argument it may be said that nothing so convincing has been put forth by those botanists who have disagreed with him.

The following from Bentham's notes on orchids will show clearly the basis for the treatment of Habenaria in the *Genera Plantarum.*

"*Habenaria,* Willd., is now a vast cosmopolitan, and in many respects polymorphous, genus, of which there are about three hundred and fifty species in the Kew herbarium, and perhaps fifty more, already published, are not there represented. The differences observed in the anther-cells, in the stigma, and in various appendages to parts of the flower are so great that numerous attempts have been made to dismember it; but the single characters assigned have all proved either so variable from species to species, or so little in accordance with any other distinction, that I feel compelled to reunite the proposed genera after the example of A. Gray and some other recent botanists, although I cannot go so far as to agree with Grenier and Godron in uniting the whole genus with *Orchis*. As it is, I have had to record no less than twenty-eight generic synonyms; and in proposing to distribute the species into the following ten sections I cannot but feel considerable doubts as to the definiteness of the characters assigned to some of them, these characters being often very difficult to ascertain in dried specimens, the only ones I have had to work upon."

Of the ten sections mentioned above, nine and ten are represented by Platanthera and Habenaria. Of these sections Bentham says: "*Platanthera* and *Habenaria* proper, comprise the great mass of the genus which most botanists consider as being susceptible of distribution into two great groups; but the various characters assigned have broken down in detail, and it would require a much longer study than I have been able to give to them, especially from dried specimens, to ascertain the real value of several apparent distinctions. It would appear, however, that *Platanthera* might be made to include the great majority of northern temperate species with the lateral processes of the stigmatic apparatus rarely much developed; and the more tropical species, with these processes usually, but variously, extended, would form the section *Euhabenaria*, the flowers in the former usually smaller than in the latter."[1]

The species of Habenaria which constitute a very distinct part of the orchid flora of North America are surprisingly few in relation to the territory over which they are distributed. With several exceptions they are very clearly differentiated, and as to their specific characters offer no perplexing problems. The species in the western United States which Dr. Rydberg referred to Piperia have been variously treated, so that at present several are recognized which in my studies I have not considered specifically distinct. In Mexico the small group composed of *H. clypeata, H. lactiflora, H. Schaffneri, H. jaliscana,* and a few others, is perplexing and later may be regarded very differently as more material helps to clarify obscure relationships. That these species are puzzling will be keenly felt by any student who attempts to distinguish them by means of an analytical key. Almost every character which at first appears to differentiate them will be found occurring sporadically here and there in individuals of several of the other species. The relation borne to the middle lobe by the lateral lobes of the trifid labellum would have to be relied on to some extent, though it is not at all constant. Yet it is inconceivable that any serious student would combine these species as variants of one polymorphic species.

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[1] For this and the preceding quotation see Bentham, "Notes on Orchideæ," *Journ. Linn. Soc.* 18: 353–355.

Up to the time of his death Mr. A. A. Eaton rendered valuable assistance toward the construction of this monograph and devoted his attention to the bibliography and to the distribution of the species. His notes are incorporated in the body of the work and may be distinguished by the initial letters of his name. His examination of the specimens preserved at Paris, which were described so inadequately by Richard, proved a vast help in the interpretation of obscure Mexican species. During his work at the Muséum d'Histoire Naturelle de Paris he obtained clear photographs of all the Habenarias collected by Galeotti, and identified our specimens by careful comparisons with the types. Through the kindness of Sir W. T. Thiselton-Dyer, Mr. Eaton and I were enabled to compare our material with the specimens in the Kew Herbarium, where we settled many of the perplexing questions relating to the species included in Lindley's *Genera and Species of Orchidaceous Plants.*

In the citation of specimens the numbers in parentheses after each locality indicate the herbaria in which the material was found. The following is a list of the herbaria loaned to me or which have been consulted, with the numbers used to designate them in the lists of distribution.

Author's Herbarium	1
United States National Herbarium	2
Gray Herbarium of Harvard University	3
Herbarium of the Missouri Botanical Garden	4
Biltmore Herbarium	5
Herbarium of the Geological Survey Department, Canada	6
Pringle Herbarium (University of Vermont)	7
Herbarium of the University of Tennessee	8
Herbarium of the San Francisco Academy of Science	9
Herbarium of Parke Davis and Company	10
Herbarium of O. A. Farwell	11
Herbarium of the Geological Survey of Alabama	12
Elliott Herbarium	13
Herbarium of the Alabama Polytechnic Institute	14
Herbarium of S. B. Parish	15
Herbarium of the College of Pharmacy, New York	16
Herbarium of Leland J. Spalding	17
Herbarium of H. D. House	18
Herbarium of the British Museum of Natural History	19
Herbarium of the Royal Botanic Gardens, Kew	20
Herbarium of the Muséum d'Histoire Naturelle de Paris	21
Herbarium of the New York Botanical Garden	22

ORCHIDACEÆ

ILLUSTRATIONS OF THE SPECIES FOUND IN MEXICO BY GALEOTTI

These illustrations were originally prepared by A. Richard. They are here reproduced from photographs, permission to use them having been given by the director of the Muséum d'Histoire Naturelle de Paris. The general outline and critical details have been copied with extreme care. To make the copies as accurate as possible no attempt was made to reverse some of the drawings on the etched plates, consequently the flowers in the prints face in the opposite direction from the originals. Had they been so constructed that they would face in the same direction, the details, shading, etc., would have been reversed during transference to the copper plates and the likelihood of error intensified. No attempt has been made to secure facsimile reproductions from the original drawings.

KEY TO THE NORTH AMERICAN SPECIES OF HABENARIA[1]

I. Plants essentially northern in their distribution. *Stigmatic processes* wanting or much reduced and inconspicuous (cf. *H. clavellata*, *H. integra*, *H. nivea*). Petals simple, not bipartite. *Labellum never divided into three filamentous or linear divisions.* In this section belong Gymnadenia, Perularia, Piperia, Limnorchis and Cœloglossum, often recognized as distinct genera.

*Labellum not fringed, if crenate not tripartite (cf. *H. peramœna*)

†Stem usually leafy. Leaves not basal, or if basal linear (cf. *H. nivea*)

Lip 2–3-toothed or lobed at the apex, not hastate, flowers greenish	
Spur shorter than the lip	1. *H. viridis* var. *bracteata*
Spur longer than the lip	2. *H. clavellata*
Lip 3-lobed or trifid, flowers white	3. *H. albida*
Lip hastate with a tubercle at base, flowers green	4. *H. flava*
Lip crenate on the margin, flowers yellow	5. *H. integra*
Lip narrowly oblong, flowers white	6. *H. nivea*
Lip rhombic-lanceolate, dilated at base, acuminate, flowers white or yellowish green	
Spur about equalling the lip	7. *H. dilatata* var. *media*
Spur longer than the lip	var. *leucostachys*
Lip lanceolate, not conspicuously dilated at base, flowers greenish,[2] spur not con-	

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[1] In strict accordance with priority Satyrium would become the valid name for this genus. I have not adopted it, as to do so would be an indirect violation of the spirit of the Vienna Rules. Harms's List retains Platanthera, which is clearly referable to Satyrium.

[2] *H. hyperborea* passes by insensible gradations into the section characterised by a linear labellum. The key is based on normal conditions of the flower. In *H. hyperborea* the flowers are usually in a dense cylindrical spicate raceme. In *H. saccata* and *H. sparsiflora* the flowers are in an elongated, slender raceme.

spicuously longer than the labellum (cf. *H. volcanica*) 8. *H. hyperborea* var. *purpurascens*
Lip lanceolate, spur stout, longer than the lip 9. *H. behringiana*
Lip linear or nearly so, dilated or lanceolate in *H. volcanica* which has an elongated filiform spur
Spur saccate, shorter than the lip 10. *H. saccata*
Spur about equalling the lip or slightly longer
11. *H. Richardii*
12. *H. Ghiesbreghtiana*
13. *H. nubigena*
14. *H. sparsiflora*
Spur much longer than the lip
Leaves reduced 15. *H. brevifolia*
Leaves elongated
16. *H. volcanica*
17. *H. limosa*
††Leaves basal, rarely more than two, soon withering in 18 and 19
¶ Leaves twice as long as broad or longer, oblong or oblanceolate, never linear or grasslike
Spur more than twice as long as the lip 18. *H. elegans* var. *maritima*
Spur about equalling the lip
19. *H. unalascensis*
20. *H. obtusata*
¶¶ Leaves rarely twice as long as broad, often orbicular
Lip oblong, longer than the spur 21. *H. Chorisiana*
Lip lanceolate, acute 22. *H. Hookeri*
Lip oblong-ligulate
Spur 1.5–2 cm. long 23. *H. orbiculata*
Spur 3–4 cm. long 24. *H. macrophylla*

**Labellum fringed, but not tripartite (here hybrids may be looked for)
Flowers yellow
Spur 5–9 mm. long 25. *H. cristata*
Spur 2–2.5 cm. long 26. *H. ciliaris*
Flowers white 27. *H. blephariglottis* var. *conspicua*

***Labellum fringed, tripartite (here hybrids may be looked for)
Flowers greenish or whitish
Petals entire or obscurely crenulate 28. *H. lacera*
Petals toothed or crenate 29. *H. leucophæa*
Flowers pale or deep magenta
30. *H. psycodes*
31. *H. fimbriata*
32. *H. peramœna*

II. Plants essentially tropical or subtropical. *Stigmatic processes* well developed, conspicuous.[1] *Petals often bipartite.* Labellum usually broken up into three *linear* divisions. The majority of the species are Mexican and West Indian.

*Labellum clearly tripartite, the divisions filiform or linear
†Petals bipartite, the posterior division broader than the anterior one
¶Leaves basal
33. *H. distans*
34. *H. jamaicensis*
35. *H. Türckheimii*
¶¶Leaves not essentially basal, usually with parallel sides, oblong to linear, clearly longer than broad
Flowers few, not more than 4, rarely 5
36. *H. setifera*
37. *H. mesodactyla*
Flowers comparatively numerous, more than 4

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[1] *Cf.* plate of *Habenaria quinquesseta.*

Spur not exceeding 2 cm. in length
Middle division of the labellum longer than the laterals 38. *H. Leprieuri*
Divisions of the labellum subequal
39. *H. Cruegeri*
40. *H. repens*
Spur exceeding 2 cm. in length
Lateral sepals about 2 cm. in length 41. *H. Pringlei*
Lateral sepals less than 2 cm. in length 42. *H. bicornis*
¶¶¶ Leaves not essentially basal, ovate to lanceolate, not much longer than broad, not oblong in the sense of having parallel sides
† Petals bipartite
Spur usually exceeding 10 cm. in length, about 8 cm. long in the variety 43. *H. macroceratitis* var. *brevicalcarata*
Spur not exceeding 10 cm. in length, not less than 4 cm. long
44. *H. lucæcapensis*
45. *H. quinqueseta*
46. *H. oreophila*
Spur not exceeding 4 cm. in length
Stems maculate 47. *H. monorrhiza*
Stems not maculate
Divisions of the labellum glandulose or minutely denticulate 48. *H. crassicornis*
Divisions of the labellum comparatively smooth, not denticulate

Anterior division of the petals longer than the posterior
49. *H. Schaffneri*
50. *H. lactiflora* var. *buccalis*
51. *H. clypeata*
52. *H. entomantha*
53. *H. jaliscana*
54. *H. diffusa*

Anterior division of the petals shorter than the posterior division or subequal to it
Raceme lax
55. *H. flexuosa*
56. *H. felipensis*
Raceme dense 57. *H. guadalajarana*

††Petals simple, subauriculate on anterior basal angle 58. *H. subauriculata*
[*H. virens*[1]]

**Labellum simple, or merely lobed or toothed, the lateral lobes, if any, never filiform or linear except in *H. virens*
†Petals bipartite 59. *H. orizabensis*
††Petals simple or merely angled, or toothed on the anterior basal angle or at the summit
Labellum rounded at base, not toothed or angled
Spur slender
60. *H. stricta*
61. *H. eustachya*
Spur inflated 62. *H. troyana*

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[1] *H. virens*, which has a trifid labellum, may be looked for here. It belongs, however, with *H. odontopetala* and its allies.

ORCHIDACEÆ

Labellum angled or toothed at the base or near the middle
Leaves linear to linear-oblong
63. *H. replicata*
64. *H. triptera*
Leaves oblong-lanceolate
Petals cuneate, truncate, not toothed on the anterior basal angle — 65. *H. petalodes*
Petals oblong, not toothed on the anterior basal angle
66. *H. Selerorum*
67. *H. brevilabiata*
Petals subquadrate, the anterior basal angle protuberant or toothed
68. *H. odontopetala*
69. *H. Purdiei*
Petals ligulate, anterior basal angle protuberant — 70. *H. Oerstedii*
Petals spathulate — 71. *H. virens*
Petals rotundate-square — 72. *H. strictissima*
Petals lanceolate
73. *H. alata*
74. *H. socialis*
75. *H. Dussii*

HABENARIA[1]

1. **H. viridis** VAR. **bracteata** *Gray,* Man. ed. 5, 500 (1867), *H. viridis* Field, For. & Gard. Bot. 825 (1868); *Willis,* Cat. N. J. 61 (1874); Yale Cat. 45 (1878); *Britton,* Prel. Cat. N. J. 94 (1881); *Day,* Pl. Buffalo 189 (1882); *Perkins,* Gen. Cat. Vt. 37 (1882); *Upham,* Fl. Minn. 139 (1884); *Dudley,* Cayuga Flora 95 (1886); *Bennett,* Pl. R. I. 48 (1888); *Perkins,* Fl. Vt. 277 (1888); *Baldw.,* Orch. N. Eng. 43, 44, 45 (1894); *Morong,* Am. Checklist 121 (1894); *Britten,* in Journ. Bot. 36: 437 (1898).

Orchis bracteata *Muhl.* MS., Willd. Sp. Pl. 4: 34 (1805); *Nutt.,* Gen. 2: 189 (1818); *Eaton,* Man. ed. 4, 374 (1824); *Big.,* Fl. Bost. ed. 2, 320 (1824), ed. 3, 342 (1840).—**O. bractealis** *Salisb.,* Paradis. t. 110 (1806–7).

Satyrium bracteatum *Pers.,* Syn. 2: 507 (1807), not *Lindl.; Muhl.,* Cat. 80 (1818).—**S. bracteale** *Salisb.,* in Tr. Hort. Soc. 1: 290 (1812).

Habenaria bracteata *R. Br.,* in Ait. Hort. Kew. ed. 2, 5: 192 (1813); *Sweet,* Fl. Gard. 1: t. 62 (1823–5); *Hook.,* Exot. Fl. 3: t. 175 (1826); *Spreng.,* Syst. Veg. 3: 689 (1826); *Torr.,* Comp. 318 (1826); *Beck,* Bot. ed. 1, 348 (1833); *Gray,* in Ann. Lyc. Nat. Hist. N. Y. 3: 231 (1836);[2] *Darl.,* Fl. Cestr. ed. 1, 506 (1837); *Big.,* Fl. Bost. ed. 3, 342 (1840); *Dewey,* Herbaceous Pl. Mass. 198 (1840); *Torr.,* in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Eaton & Wr.,* N. A. Bot. ed. 8, 260 (1840); *Macoun,* Cat. 4: 14 (1888); *Britton,* Cat. N. J. 234 (1889); *Watson & Coulter,* in Gray's Man. ed. 6, 507 (1890); *Beal & Wheeler,* Fl. Mich. 607 (1891); *Fernald,* Port. Cat. ed. 2, 64 (1892); *MacMillan,*

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[1] The bibliographical references have been arranged in chronological order under each specific name. With a few exceptions, the citations are confined to the author's library.

[2] For an account of Gray's paper, reference should be made to the notes accompanying the bibliography under *Habenaria Hookeri.*

H. viridis Metasp. Minn. Val. 168 (1892); *Gray*, Field, For. & Gard. Bot. rev. ed. 408 (1895); *Rydb.*, in Contr. U. S. Nat. Herb. 3: 524 (1896); *Britton & Br.*, Ill. Fl. 1: 463 (1896); *Clute*, Fl. Up. Susq. 105 (1898); *Saunders*, Fl. S. Dak. 131 (1899); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Gattinger*, Fl. Tenn. 62 (1901); *Driggs*, Fl. Conn. 16 (1901); *Mathews*, Field-book 84 (1902); *Kennedy*, in Rho. 6: 111 (1904); *Jelliffe*, Gibson's Nat. Orch. 42, pl. 19 (1905); *Ames*, in Gray's Man. ed. 7, 303 (1908).

Orchis viridis *Pursh*, Fl. 2: 587 (1814), excl. syn. in part; *Nutt.*, Gen. 2: 189 (1818); *Elliott*, Sketch 2: 486 (1824); *Eaton & Wr.*, N. A. Bot. ed. 8, 334 (1840); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 29, 533 (1853), ed. 41, 533 (1856); *Provanch.*, Fl. Canad. 2: 566 (1862); *Darby*, Bot. S. St. 526 (1866).

Gymnadenia viridis *Spreng.*, Syst. Veg. 3: 698 (1826) in part.

Habenaria viridis *Cham.*, in Linnæa 3: 31 (1828).

Gymnadenia bracteata *Presl*, Rel. Hænk. 92 (1830).

Orchis viridis β Vaillanti *Ten.*, Syll. add. 629 (1831).

Cœloglossum Vaillanti *Guss.*, Litt. according to Kränzlin.

Peristylus bracteatus *Lindl.*, Gen. & Sp. Orch. 298 (1835); *Hook.*, Fl. Bor. Am. 2: 201 (1839); *Steud.*, Nomencl. ed. 2, 2: 305 (1841); *Ledeb.*, Fl. Ross. 4: 71 (1853).

Platanthera bracteata *Torr.*, Fl. N. Y. 2: 279 (1843); *Gray*, Man. ed. 1, 470 (1848), ed. 2, 445 (1856), ed. 3, 445 (1859); *Darl.*, Fl. Cestr. ed. 3, 311 (1853); *Beck*, Bot. ed. 2, 348 (1856); *Tatnall*, Cat. Pl. Newc. Co. Del. 75 (1860); *Chapm.*, Fl. S. U. S. ed. 1, 460 (1860), ed. 2, 460 (1884), ed. 3, 486 (1897); *Paine*, Pl. Oneida Co. 84 (1865); Portl. Cat. 7 (1868).

Cœloglossum bracteatum *Parl.*, Fl. Ital. 3: 409 (1858); *Correvon*, Orch. Rust. 61 (1893); *Rydb.*, in Mem. N. Y. Bot.

H. viridis

Gard. 1: 106 (1900), in Britton's Man. 292 (1901); *Small*, in Porter's Fl. Pa. 92 (1903) and Fl. Se. U. S. 312 (1903); *House*, in Torreya 3: 51 (1903); *Jelliffe*, in Torreya 4: 99 (1904); *Farr*, in Contr. Bot. Lab. Univ. Pa. 3: 28 (1907).—**C. viride β bracteatum** *Richter*, Pl. Europ. 1: 279 (1890).

Platanthera viridis VAR. **bracteata** *Reichb. f.*, Orch. Eur. 130, t. 33 (435) (1851); *Kränzl.*, Orch. Gen. et Sp. 1: 617 (1899).

Peristylus bracteatus f. **major** *Franch. & Sav.*, Enum. Pl. Jap. 2: 31, 513 (1879).—**P. viridis** VAR. **bracteata** *Kurtz*, in Engl. Bot. Jahrb. 19: 408 (1895) (*where he refers it to Reichb. f.*).

Platanthera viridis *Finet*, in Bull. Soc. Bot. Fr. 47: 284 (1900).—**P. Chorisiana** *Kränzl.*, Orch. Gen. et Sp. 1: 615 (1899) as to characters of the labellum and fig. in Reichb. f. Orch. Eur.

"*56. ORCHIS *bracteata.*

"O. labello lineari apice bifido, petalis subconniventibus, lateralibus ovatis latioribus, cornu obtuso scrotiformi, bracteis flore duplo longioribus patentibus. W.

"Orchis bracteata *Mühlenberg in litt.*

"Beblätterte Ragwurz. W.

"*Habitat in* Pensylvania (*v. s.*)

"Radix *palmata.* Caulis *spithamæus.* Folia *ovata reticulata, facie et magnitudine epipactidis latifoliæ.* Flores *virides paulo majores quam in præcedente.*[1] Petala *tria superiora conniventia, bina lateralia duplo latiora ovata recta.* Labellum *lineare dependens, apice bifidum cum mucrone parvo obscuro inter lacinias, sæpius deficiente.* Cornu *obtusum brevissimum scrotiforme.* Bracteæ *oblongo-lanceolatæ flore duplo, quandoque triplo fere, longiores patentes.* W." Willd. *loc. cit.*

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[1] *Orchis viridis.*

ORCHIDACEÆ

H. viridis

That the North American plant is distinct from the *Habenaria viridis* of the Eastern Hemisphere is not clear. Lindley regarded his specimens from Siberia identical with those from North America. Reichenbach referred *Orchis bracteata* Willd. to *Platanthera viridis* as var. *bracteata*, and characterized it by the elongated floral bracts.

NOVA SCOTIA

Boggy spots near Island Pond, Sable Isl., July 26, 1899, *J. Macoun* (6).

NEW BRUNSWICK, Victoria County

Mountain back of Clair's, July 11, 1904, *A. A. Eaton* (no. 92) (1).

QUEBEC, Ottawa County

In woods, Buckingham, May 11, 1903, *J. Macoun* (6).—Woods, Chelsea, May 22, 1891, *Macoun* (6).

KEEWATIN

Mouth of Albany River, James Bay, July 25, 1904, *W. Spreadborough* (6).

ONTARIO, Nipissing District

In woods, Rainy Lake, June 12, 1900, *J. Macoun* (6).

Hastings Co.: Rich woods, rather scarce, near Belleville, June, 1865, *J. Macoun* (1, 6).—In damp woods, June 10, 1872, *Macoun* (6).

York Co.: Scarborough, June 1, 1898 (Biltmore 6370a) (5).

Wellington Co.: Puslinch Lake, July 16, 1904, *A. B. Klugh* (1).

MANITOBA

In damp thickets, Strong Mt., June 4, 1896, *J. Macoun* (6).—In woods, Rat River, Otterburne, June 1, 1896, *Macoun* (6).—Brandon, June 13, 1880, *Macoun* (6).—Lake Winnipeg Valley, 1837, *Bourgeau* (3).

ATHABASCA

Open prairies, Peace River Landing, June 13, 1903, *J. M. Macoun* (1, 6).

SASKATCHEWAN

In thickets at Prince Albert, June 30, 1896, *J. Macoun* (6).

ASSINIBOIA

In boggy places, Qui Appelle Valley, June 22, 1879, *J. Macoun* (6).—Regina, 1903, *T. N. Willing* (1).—In thickets, Wood Mountains, June 17, 1896, *Macoun* (6).—Moore Mt., July 3, 1880, *Macoun* (no. 173) (3).

ALBERTA

Meadows behind Tunnel Mt., 4450 ft., July 6, 1899, *W. C. McCalla* (no. 2231) (2, 5).—Athabasca River, June 26, 1898, *W. Spreadborough* (6). —Athabasca River near Lac Brule, June 30, 1898, *Spreadborough* (6). —In grassy thickets, Red Deer, June, 1895, *Gaetz* (6).—Shore of Waterton Lake, South Kootenay Pass, July 28, 1895, *J. Macoun* (6).—Prairies, Kananaskis, June 13, 1885, *Macoun* (6).—Burger's Pass, Yoho Valley, August 27, 1904, *Macoun* (1).—Damp places, only specimen seen, Calgary, June 7, 1897, *Macoun* (6).—Rocky Mountain Park, east of Spray Bridge, Banff, July 11, 1891, *Macoun* (6).—Mountains north of Devil's Lake, July 5, 1900, *N. B. Sanson* (6).—Banff, *Sanson* (1).—Near Banff, July 11, 1891, *Macoun* (2, 3, 4).

BRITISH COLUMBIA

Telegraph Trail, lat. 54°, June 17, 1875, *J. Macoun* (6).

YALE DIST.: Northwest of Spence's Bridge, June 6, 1889, *J. M. Macoun* (6).

VANCOUVER ISL.: Grassy places, Mt. Finlayson, June 18, 1887, *J. Macoun* (6).

ALASKA

Kyska Harbor, July 19, 1873, *W. H. Dall* (3).—Arakamtchetchene Isl., Bering Straits, Ringgold-Rogers Exp., 1853–6, *Ch. Wright* (3) (*H. viridis?*). —Boggy spots, Bering Isl., September 1, 1891, *J. M. Macoun* (6).—Boggy places, Attu Isl., August 29, 1891, *J. M. Macoun* (6).—Popoff Isl., July 10, 1899, *De Alton Saunders* (no. 3302) (4).—Kadiak, July 1, 1899, *Wm. Trelease* (no. 3300) (4); July 4, 1899, *Trelease* (no. 3301) (4).—Disenchantment Bay, August 12, 1902, *Frederick Funston* (no. 112) (3, 4).

MAINE

Jemtland, July 16, 1900, *Dr. D. W. Fellows* (1).—Moist wooded slopes of Mt. Aziscoos, July 31, 1903, *B. L. Robinson* (3).—Banks of Wassataquoik River, May, 1887 (Hb. Thurber) (3).

AROOSTOOK CO.: 1903, *F. T. Hubbard* (1).—Fort Kent, July 11, 1904, *A. A. Eaton* (no. 92) (1); hillside woods, July 18, 1904, *Eaton* (no. 169 a) (1).

PISCATAQUIS CO.: Deciduous woods, Rum Mt., July 5, 1895, *M. L. Fernald* (no. 267) (3, 4).

FRANKLIN CO.: High woods, Mt. Saddleback, July 16, 1902, *Clarence H. Knowlton* (no. 491) (1).—Bog on Mt. Saddleback, Wilton, August 1, 1899, *L. J. Spalding* (17).

H. viridis NEW HAMPSHIRE

Near Jack's House, White Mts., June 8, 1881, *Faxon* (3).—Base of White Mountains, *Oakes* (2).

Coos Co.: Mt. Adams, July, 1878, *Faxon* (3).

Grafton Co.: Profile House, Franconia, July 6, 1855, *Wm. Boott* (3); Profile House, July 4, 1879, *Faxon* (3).

Cheshire Co.: Wooded slope, Gap Mt., Troy, May 30, 1899, *B. L. Robinson & E. L. Rand* (no. 723) (3).

VERMONT, Orleans County

Woods, side of Willoughby Mt., June 18, 1861, *J. Blake* (16).—Woods near Willoughby Lake House, June 27, 1884, *Faxon* (3).—Willoughby Mt., June 6, 1885, *Warren H. Manning* (6).

Lamoille Co.: Belding Pond, Johnson, May 23, 1895, *A. J. Grout* (2); Johnson, June 3, 1895, *L. R. Jones* (5).

Caledonia Co.: Peacham, June 2, 1884, *F. Blanchard* (4); May 28, 1886, *Blanchard* (4).

Chittenden Co.: Moist woods, Charlotte, May 31, 1886, *C. G. Pringle* (7). —Cold mountain woods, Huntington, June 20, 1876, *Pringle* (7).—Chittenden, August 18, 1895, *W. W. Eggleston* (14).

Addison Co.: Cold woods, Monkton, September 24, 1878, *C. G. Pringle* (7).—Lost Pleiad Lake, Hancock, June 10, 1902, *E. Brainerd* (1).—Salisbury, July 26, 1903, *W. W. Eggleston* (1).—Middlebury, June 7, 1879, *Brainerd* (5); May 25, 1878, *Brainerd* (2).

Orange Co.: Strafford, July 25, 1891, *L. R. Jones* (5).

Rutland Co.: E. Wallingford, July 7, 1898, *W. W. Eggleston* (5, 14).

Bennington Co.: Manchester, June 29, 1898, *M. A. Day* (no. 370) (2, 5). —Chittenden, August 18, 1895, *Eggleston* (14).

MASSACHUSETTS, Middlesex County

Pine woods, only specimens found, South Framingham, May 12, 1890, *E. L. Sturtevant* (4).

Worcester Co.: Mossy wet nook on the face of a cliff, Rocky Hill, Oxford, 820 ft. alt., May 5, 1900, *Leland J. Spalding* (17).

Franklin Co.: Shelburne, June 28, 1873, *Miss S. E. Anderson* (10).

Hampshire Co.: South Hadley, 1887, *A. C. Cooke* (2).—Young deciduous woods, South Hadley, May 27, 1905, *R. G. Leavitt* (1).—Northampton, *E. Hitchcock, Jr.* (3).

CONNECTICUT, New Haven County

Mt. Carmel, near New Haven, June 25, 1884, *W. E. Safford* (2).

NEW YORK, Herkimer County

Cold damp woods, July, 1879, *Frank Tweedy* (2).

Washington Co.: Mt. Hope, Ft. Ann Mts., June 26, 1896, *Stewart H. Burnham* (1).

Monroe Co.: Rochester, May 21, 1863, *Wm. Boott* (3).

Onondaga Co.: Woods near Carpenter's pond, Fabius, July 22, 1905, *H. D. House* (no. 1346) (18).

NEW JERSEY, Sussex County

Near Bloom Swamp, Stockholm, August 13, 1895, *Wm. Van Sickle* (2).

Warren Co.: Delaware Water Gap, July 5, 1875, *Mr. Knipe* (3).

PENNSYLVANIA, Crawford County

1868, *McMullen* (2).

Northampton Co.: Vicinity of Easton, 1868, *A. P. Garber* (2); near Easton, May, 1872, *Thos. C. Porter* (2).

OHIO, Lucas County

Toledo, May 18, 1884, *H. A. Young* (3).

Lorain Co.: Oberlin, May 17, 1895, *W. M. Dick* (1).—Amherst, June 12, 1895, *A. E. Ricksecker* (2).

Medina Co.: Woods, Medina, June, 1897, *G. B. Ashcroft* (5); May 30, 1898, *Ashcroft* (14).

ILLINOIS, Winnebago County

Rockford, May 30, 1888, *Kate C. Penfield* (2).

MICHIGAN, Keweenaw County

Woods, August, 1886, *O. A. Farwell* (3).—Clifton, May, 1884, *Farwell* (11).—Moist woods, Keweenaw Point, June 13, 1884, *Frank E. & Floy J. Wood* (2).

Marquette Co.: July 9, 1883, *G. F. A.* (2).—Turin, May 31, 1901, *Bronson Barlow* (1, 2).—Marquette, August, 1868, *Wm. M. Canby* (1, 16).

Mackinac Co.: Mackinac Isl., June 30, 1889, *G. H. Hicks* (10); June 24, 1888, *Hicks* (2).

Iosco Co.: Oscoda, June, 1882, *R. A. Barr* (3).

Ionia Co.: Hubbardston, May, 1872, *C. F. Wheeler* (8).

St. Clair Co.: Wet woods, Port Huron, May 31, 1838, *Houghton* (3); August 6, 1893, *Chas. K. Dodge* (no. 104) (3).

H. viridis Wayne Co.: Detroit, May 30, 1895, *Oliver A. Farwell* (11).

WISCONSIN, Brown County

June, 1883, *J. H. Schuette* (1).—Bellevue, May 27, 1882, *Schuette* (1).—Cedar swamp, May 18, 1878, *Schuette* (1).

Milwaukee Co.: Milwaukee, 1843, *I. A. Lapham* (4).

Racine Co.: Cool woods, shores of Lake Michigan, May 22, 1897, *S. C. Wadmond* (5).

MINNESOTA

Short Line Park, 1889, *F. F. Wood* (2).

Hubbard Co.: Woods, Park Rapids, June 22, 1891, *J. H. Sandberg* (no. 1235) (2).

Stearns Co.: St. Cloud, September, 1892, *F. W. Dewart* (4).

Winona Co.: Homer Road near Winona, May, 1886, *J. M. H(olzinger)* (2).

IOWA, Fayette County

Fayette, rare, June, 1893, *B. Fink* (2).

Pottawattamie Co.: Prairie groves, near Council Bluffs, rare, April 18, 1839, *Chas. A. Geyer* (2).

NEBRASKA

Banks, etc., along cañon streams, near Bonnet, 5000 ft., June, 1890, *Tom A. Williams* (4).

SOUTH DAKOTA, Custer County

Black Hills, *W. S. Rusby* (10).—Harney Peak, 7000 ft., July 20, 1892, *P. A. Rydberg* (no. 1029) (2).

MONTANA

Woods bordering Flathead River, July 27, 1883, *Wm. M. Canby* (no. 310) (16).

Gallatin Co.: Low wet shady woodlands, not rare, Bozeman, June 22, 1899, *J. W. Blankinship* (1, 4).

WASHINGTON

Cascade Mts., lat. 49°, 1859, *Dr. Lyall* (3).—From Fort Colville to Rocky Mts., 1861, *Dr. Lyall* (3).

JAPAN

Sappon, June, 1878 (3).

CHINA

Hu-pe Province, Central China, 1885–8, *Dr. August Henry* (no. 6874) (3).

2. H. clavellata (*Michx.*) *Spreng.*, Syst. Veg. 3: 689 (1826); *Sw.*, Adnot. Bot. 45 (1829); *Britton & Br.*, Ill. Fl. 1: 468, f. 1104 (1896); *Clute*, Fl. Up. Susq. 105 (1898); *Kearney*, in Contr. U. S. Nat. Herb. 5: 522 (1901); *Gattinger*, Fl. Tenn. 62 (1901); *Lounsberry*, South. Wild Fl. 78 (1901); *Jelliffe*, Gibson's Nat. Orch. 48, t. 20 (1905); *Ames*, in Gray's Man. ed. 7, 309 (1908). *H. clavellata*

Orchis clavellata *Michx.*, Fl. Bor. Am. 2: 155 (1803); *Willd.*, Sp. Pl. 4: 10 (1805); *Pers.*, Syn. 2: 505 (1807); *Muhl.*, Cat. 80 (1818); *Pursh*, Fl. 2: 586 (1814); *Elliott*, Sketch 2: 486 (1824).— **O. tridentata** *Muhl.*, ex Willd. Sp. Pl. 4: 41 (1805); *Pers.*, Syn. 2: 506 (1807); *Pursh*, Fl. 2: 587 (1814); *Torr.*, Cat. N. Y. 69 (1819); *Barton*, Fl. 1: 52, t. 15 (1821); *Eaton*, Man. ed. 4, 374 (1824); *Torr.*, Comp. 317 (1826); *Short*, Cat. Ky. 10 (1833); *Dewey*, Herbaceous Pl. Mass. 197 (1840); *Wood*, Class-book ed. 29, 533 (1853), ed. 41, 533 (1856), not *O. tridentata* Scop.— **O. clavellata β tridentata** *Muhl.*, Cat. 80 (1818); *Green*, Cat. N. Y. 120 (1814); *Barton*, Comp. Fl. Phil. 2: 187 (1818); *Nutt.*, Gen. 2: 189 (1818).

Habenaria tridentata *Hook.*, Exot. Fl. 2: t. 81 (1825); *Spreng.*, Syst. Veg. 3: 689 (1826); *Sw.*, Adnot. Bot. 46 (1829); *Lodd.*, Bot. Cab. t. 1687 (1832); *Beck*, Bot. ed. 1, 348 (1833); *Darl.*, Fl. Cestr. 507 (1837); *Torr.*, in Geol. Surv. N. Y. 174 (1840); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840); *Darby*, Bot. S. St. 527 (1866); *Gray*, Man. ed. 5, 499 (1867), ed. 6, 506 (1890); *Willis*, Cat. N. J. 61 (1874); *J. Robinson*, Fl. Essex Co. 107 (1880); Pl. Malden & Medf. 11 (1881); *Britton*, Prel. Cat. N. J. 98 (1881); *Perkins*, Gen. Cat. Vt. 37 (1882); *Gattinger*, Tenn. Fl. 88 (1887); *Macoun*, Cat. 4: 18 (1888); *Dame & Collins*, Fl. Middlesex 102 (1888); *Britton*, Cat. N. J. 284 (1889); *Beal & Wheeler*, Fl. Mich. 607 (1891); *MacMillan*, Metasp. Minn. Val. 168 (1892); *Baldw.*, Orch. N. Eng. 97, f. 20 (1894); *Galen*, *H. clavellata* Fl. Lanc. Co. (1895), 15 (1898); *Russell*, in Rho. 1: 200 (1899); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Mathews*, Field-book 84, 85, 90 (1902).

Gymnadenia tridentata *Lindl.*, Gen. & Sp. Orch. 277 (1835); *Hook.*, Fl. Bor. Am. 2: 195 (1840); *Steud.*, Nomencl. ed. 2, 1: 712 (1841); *Torr.*, Fl. N. Y. 2: 278 (1843); *Gray*, Man. ed. 1, 469 (1848), ed. 2, 444 (1856), ed. 3, 444 (1859); *Darl.*, Fl. Cestr. ed. 3, 310 (1853); *Green & Congd.*, Class-book 202 (1855); *Beck*, Bot. ed. 2, 346 (1856); *Tatnall*, Cat. Pl. Newc. Co. Del. 74 (1860); *Chapm.*, Fl. S. U. S. ed. 1, 459 (1860), ed. 2, 459 (1884), ed. 3, 485 (1897); *Hervey*, Cat. 21 (1860); *Wood*, Class-book 683 (1861); *Tracy*, Essex Fl. 30 (1892); *Correvon*, Orch. Rust. 94 (1893).

Platanthera tipuloides *Hook.*, Fl. Bor. Am. 2: 195 (1839) in syn.[1]

Orchis tipuloides *Hook.*, Fl. Bor. Am. 2: 195 (1839) in syn., not *Fischer* in hb.

Gymnadenia tridentata β clavellata *Wood*, Class-book 683 (1861).

Peristylus clavellatus *Kränzl.*, Orch. Gen. et Sp. 1: 521 (1898), 926 (1901).

Gymnadeniopsis clavellata *Rydb.*, in Britton's Man. 293 (1901); *Small*, Fl. Se. U. S. 316 (1903), in Porter's Fl. Pa. 92 (1903); *Lighthipe*, in Torreya 3: 80 (1903); *House*, in Torreya 3: 51 (1903); *C. B. Robinson*, in Bull. Pictou Acad. 1: 35 (1907). (See *Habenaria lacera* x *clavellata*, Niles, Bog-trotting for Orchids, 257, sub *H. lacera*.)

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[1] Hooker (*Fl. Bor. Am.* 2: 195) makes *Platanthera tipuloides* Lindl., *Orchis tipuloides* L., *O. gracilis* Fisch. = *Gymnadenia tridentata*, basing his opinion on a fragment of Fischer's distribution in his herbarium. MacMillan and Macoun follow him, but I think he must be entirely mistaken, a view apparently held at Kew, for Index Kewensis makes *Pl. tipuloides* = *Tipularia Kamtschatica*. (A. A. E.)

"O. bulbis tenuiter fusiformibus: scapo oblonge unifolio: spica laxiuscule pauciflora; bracteis brevibus: calyce minuto, connivente; cornu longitudine ovarii, clavato; labello ovali, integro. *H. clavellata*

"*Hab.* in Carolina." Michx. *loc. cit.*[1]

Habenaria clavellata is a very distinct species with no near ally in North America. The appendages of the gynostemium are quite characteristic. These are three in number, erect and tuberculate.

NEWFOUNDLAND

Damp soil, brookside, near Topsail, Conception Bay, August 12–19, 1901, *C. D. Howe & W. F. Lang* (no. 1352) (3).—Swamps, Manuels, August 8, 1894, *B. L. Robinson & H. Schrenk* (no. 167) (2, 3, 4, 6).—Bogs, Chimney Cove, Bay of Islands, July 21, 1895, *A. C. Waghorne* (4).—Low woods, July, 1885, *R. Bell* (6).—Barred Isl., August 28, 1903, *J. D. Sornborger* (1).

NOVA SCOTIA

Cape Torment, 1825, *Mrs. Shepard* ex Hb. Thurber (3).—In damp, marshy spots, Sable Isl., July 28, 1899, *J. Macoun* (6).

CAPE BRETON Co.: Boggy meadow, Sydney, August 18, 1902, *M. L. Fernald* (1, 3).—Halfway House, August 5, 1898, *J. Macoun* (1, 4, 6).—Damp places, Baddeck, July 24, 1898, *Macoun* (6).—Wet woods, Baddeck, July 18, 1883, *Macoun* (6).—New Campbellton, July 23, 1897, *David White & Chas. Schuchert* (no. 26) (2, 6).

CUMBERLAND Co.: Cold bog, Truemanville, July 25, 1884, *H. Trueman* (3).

GUYSBOROUGH Co.: Damp places, Boylston, July, 1890, *Dr. C. A. Hamilton* (6).

PRINCE EDWARD ISLAND

Tracadie, August 2, 1888, *J. Macoun* (6).

NEW BRUNSWICK

August 12, 1869, *J. Fowler* (3).—Bass River, July 21, 1875, *Fowler* (2).

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[1] The type in Michaux's herbarium at the Paris Museum is annotated as follows: "Orchis clavellata, calcare clavato, labello ignoto. Carolina? innominato." It would thus appear that Michaux was unfamiliar with the lip of the plant, as suggested by Boott, in a letter to Lindley quoted on pages 277, 278 of *Gen. & Sp. Orch.* (A. A. E.)

H. clavellata Northumberland Co.: Miramichi, August 4, 1892, *Fowler* (4).

Kent Co.: August 14, 1869, *Fowler* (16).

QUEBEC

Island of Anticosti, *Pursh* ("*Orchis oscillata n. sp.*") (3) (ex Hb. Geo. Thurber, Comm. Mrs. Shepard).

ONTARIO

In a peat bog, Catfish Lake, Algonquin Park, July 23, 1900, *J. Macoun* (6).—White Lake, July 22, 1898 (Biltmore no. 490b) (5).

Hastings Co.: Bogs and marshes, North Hastings, July 12, 1878, *J. Macoun* (6).

Wellington Co.: Blueberry marsh, Killean, July 19, 1904, *A. B. Klugh* (1).—Bogs, Edmonton, August 2, 1890, *Jas. White* (6).

Essex Co.: Leamington, August 2, 1892 (6).

MAINE

Silver Lake, Scribner, July 31, 1878 (8).

Aroostook Co.: In sphagnum, Fort Kent, August 11, 1901, *M. L. Fernald* (3).—Bog at Fort Kent, July 17, 1904, *A. A. Eaton* (no. 155) (1).

Somerset Co.: Swamps from Stacyville to City Camp, July 17–18, 1900, *M. L. Fernald* (3).—Cedar swamp, Madison, July 2, 1903, *A. A. Eaton* (1).

Franklin Co.: Grassy bog, New Sharon, July 25, 1899, *L. J. Spalding* (17).—Peat bog, New Sharon, August 10, 1902, *C. H. Knowlton* (1).—Grassy wayside, South Chesterville, July, 1903, *Lillian O. Eaton* (1).—Swamp, Strong, August 1, 1902, *C. H. Knowlton* (1).—Moist field, Farmington, August, 1900, *C. H. Knowlton* (1).

Oxford Co.: Moist woods, Waterford, August 8, 1883, *Blake* (no. 990) (2).—Bethel, July 28, 1865, *Wm. Boott* (3).

Hancock Co.: Mt. Desert, July, 1871, *Wm. Boott* (3).—Common in moist grassy places, Mt. Desert, July, 1879, *D. C. Eaton* (3).—Wet roadsides, Seal Harbor, July 27, 1887, *John H. Redfield* (16); July 27, 1885, *Redfield* (4).—Great Cranberry Isl., September 3, 1885, *J. H. Redfield* (4).—Bar Harbor, July 26, 1888, *Faxon* (3).

Waldo Co.: Wet roadside, New Guinea, Islesboro, August 4, 1897, *F. Tracy Hubbard* (1).

Kennebec Co.: Augusta, July 1, 1885, *E. C. Smith* (4).

Lincoln Co.: Monhegan Isl., 1902, *F. Grace Smith* (no. 78) (3).

Sagadahoc Co.: Georgetown, August 9, 1902, *Hollis Webster* (3).
Cumberland Co.: Brunswick, 1862, *E. L. Sturtevant* (4).

NEW HAMPSHIRE

Base of White Mts., September, 1842, *A. Gray* (3).

Coos Co.: Dismal Pond near Glen House, August 15, 1855, *Wm. Boott* (3). —Randolph, *Faxon* (3); July, 1889, *Clara E. Cummings* (4).—Peat bogs, common, Crawford House, August 14, 1895, *E. H. Eames* (2).

Grafton Co.: Pond, Cannon Mt., August 1, 1863, *Wm. Boott* (3).

Belknap Co.: Gilmanton, August 8, 1864, *J. Blake* (4).

Cheshire Co.: Woods, Jaffrey, July 17, 1898, *B. L. Robinson* (no. 476) (3); bog, August 11, 1890, *Walter Deane* (1, 2).

VERMONT

Caledonia Co.: Head of Winooski River, Peacham, August 7, 1886, *F. Blanchard* (2).

Chittenden Co.: Sphagnous swamp, Charlotte, July 29, 1879, *C. G. Pringle* (7).—Richmond, July 19, 1899, *Eggleston* (no. 1627) (2, 4).

Addison Co.: Cold peat bog near summit, Mt. Mansfield, July, 1896 (5). —Bristol Pond bog, July 30, 1877, September 27, 1878, *C. G. Pringle* (7).

Rutland Co.: Chittenden, August 18, 1895, *W. W. Eggleston* (5, 14).

MASSACHUSETTS, Essex County

Andover, July 29, 1882, *C. W. Swan* (6).—Salisbury, July, 1903, *A. A. Eaton* (1).

Middlesex Co.: Medford, August 15, 1858, *Wm. Boott* (3).

Worcester Co.: Lunenberg, August 18, 1884, *C. W. Swan* (6).—Rare, wet meadow bordering Lake Chaubunagungamaug, Webster, July 25, 1899, *E. A. Spalding* (17).

Franklin Co.: Sunderland, September 3, 1874, *S. Watson* (3).—Shelburne, *Miss S. E. Anderson* (10).

Hampshire Co.: Southampton, 1892, Hb. Chapman (5).

Norfolk Co.: Dedham, July, 1875, *E. H. Hitchings* (3).—Moist shady border of thicket, Stoughton, September 21, 1904, *R. G. Leavitt* (1).

Plymouth Co.: Swamp near Quaker Leonard Road, Brockton, July 16, 1903, *A. A. Eaton* (1).

Bristol Co.: North Easton, July, 1899, *O. Ames* (1); July 31 and September 25, 1901, *R. G. Leavitt* (5).—Easton, August, 1897, *Carl Blomberg* (1).—Nonquit, August 30, 1888, *E. L. Sturtevant* (4).

H. clavellata

Barnstable Co.: Hyannisport, August 29, 1888, *Walter Deane* (2).

Dukes Co.: Martha's Vineyard, August, 1888, *Carrie Harrison* (2).

RHODE ISLAND, Providence County

Swamps, Providence, August, 1844, *Geo. Thurber* (3).—Low field, Providence, July 31, 1892, *J. Franklin Collins* (2).

Kent Co.: Warwick, September 3, 1871, *J. W. Congdon* (4).

CONNECTICUT, Litchfield County

Wooded swamp, Woodbury, August 19, 1903, *E. B. Harger* (1).

Hartford Co.: Low ground, Southington, August 20, 1898, *L. Andrews* (no. 325) (3).

New Haven Co.: Oxford, August 23, 1879, *E. B. Harger* (no. 471) (2). —Bradford, August 4, 1877, *Wm. Trelease* (4).

Fairfield Co.: Rich woods, rather rare, Stratford, August 28, 1893, *E. H. Eames* (2).

NEW YORK

Dr. Torrey (13).—Western New York, *A. Gray* (3).—Vaughns, July 8, 1897 (14).

Warren Co.: Bear Pond on French Mt., July 25, 1892, *Stewart H. Burnham* (1).

Oneida Co.: Swampy places near White Lake, Forestport, July 15, 1903, *J. V. Haberer* (no. 888) (1).

Onondaga Co.: Swamp near Baldwinsville, *W. M. Beauchamp* (1).—Tully, 1869, *S. N. Cowles* (4).

Chenango Co.: McDonough, July 27, 1886, *F. V. Coville* (2); August 2, 1884, *Coville* (2).

Suffolk Co.: Montauk Point, July 23, 1895, *Jos. Schrenk* (4).—Wading River, July 12, 1872, *E. S. Miller* (10).

NEW JERSEY

August, 1842, *Thos. P. James* (2).—Wet places, pine barrens, September 16, 1879, *Geo. Engelmann* (4).

Sussex Co.: Wet woods, Cranberry Lake, July 31, 1904, *Kenneth K. Mackenzie* (no. 834) (1).

Passaic Co.: Passaic, August, 1887, *Sereno Watson* (3).

Ocean Co.: Swamps, Tom's River, August 6, 1903, *M. W. Lyon* (2).

Camden Co.: Winslow, September 7, 1873, *Isaac C. Martindale* (4).

PENNSYLVANIA

August 7, 1847, *Thos. P. James* (2).—Conewago Mts., July, 1898, *C. W. Eisenhower* (4).

Luzerne Co.: Lily Lake, July 29, 1889, *A. A. Heller* (3).

Lancaster Co.: 1885, *Jas. Galen* (4).—Smithville Swamp, September 2, 1889, *A. A. Heller* (3); July 22, 1889, *John K. Small* (2).—In new red sandstone, near Mt. Hope, September 27, 1901, *A. A. Heller* (2).

DELAWARE, Newcastle County

Swamps, near Wilmington, June, 1896, *Wm. M. Canby* (5).

Sussex Co.: Swamps, Lewes, July 27, 1878, *Canby* (16).—Rehoboth, July, 1878, *Canby* (8).

MARYLAND, Montgomery County

Forest Glen, September, 1898, *Henry W. Olds* (2).—Woodside, July 28, 1895, *C. L. Pollard* (2).

Anne Arundel Co.: Wet thickets, Glen Burine, July 18, 1894, *C. E. Waters* (2).—Near Curtis Bay, December 11, 1893, *Adam Steitz* (2).

Prince George Co.: Ammendale, 1898, *Dr. Gerritt S. Miller* (2).

DISTRICT OF COLUMBIA

In swamps, rare, August 6, 1900, *Theo. Holm* (1).—Moist spot in hill, August 11, 1896, *E. S. Steele* (3, 4).—Blagden's Run, August 6, 1892, *J. M. Holzinger* (2).—Occoquan Creek, July 16, 1876, *L. F. Ward* (2).

VIRGINIA

Summit of Salt Pond Mt., 4500 ft., 1858, *Wm. M. Canby* (16).

Fairfax Co.: Arlington railroad, August 11, 1896, *E. S. Steele* (2).

Page Co.: Blue Ridge near Luray, 3600 ft., August 18, 1901, *Mr. & Mrs. E. S. Steele* (no. 108) (2, 3, 4).

Warren Co.: Damp thicket near Waterlick, July 30, 1897, *Gerritt S. Miller, Jr.* (2).

Nansemond Co.: Damp soil, Suffolk, July 27, 1897 (5).

Norfolk Co.: Great Dismal Swamp, July 13, 1898, *Thos. H. Kearney, Jr.* (no. 1648) (2).

NORTH CAROLINA

Orchis clavellata, calcare, clavato, labello ignoto. Carolina? innominato, Hb. Michaux (21), *type.*—Mountains, 1842, *Met Curtis* (4).

Watauga Co.: Vicinity of Blowing Rock, July 31, 1890, *A. A. Heller* (4).

H. clavellata Buncombe Co.: Biltmore, August, 1894 (5).—Wet places, Craggy Mts., August 12, 1897 (Biltmore no. 490a) (2, 3, 5).

Swain Co.: Andrew's Bald, 6000 ft., August 15, 1891, *Beardslee & Kofoid* (3).

Jackson Co.: Cullowhee, June 15–July 15, 1887, *Roland Thaxter* (3).

Polk Co.: Spring Mountain Park, August 3, 1897, *E. C. Townsend* (2).

Moore Co.: Southern Pines, July 18, 1895, *J. W. Blankinship* (1).

Cleveland Co.: Moist soil near King's Mt., August 1, 1902 (Biltmore no. 490d) (5).

SOUTH CAROLINA, Greenville County

Moist ravines, Cæsar's Head, July 30, 1881, *John Donnell Smith* (3).

Richland Co.: In wet soil near Columbia, July 31, 1900 (Biltmore no. 490c) (5).

Aiken Co.: Aiken, July, 1869, *H. W. R(avenel)* (2).

Berkeley Co.: Rich damp soils, Santee Canal, July, *H. W. Ravenel* (3).

GEORGIA, Whitfield County

Wet woods at eastern base of Taylor's Ridge, 1000 ft., July 26, 1900, *Percy Wilson* (no. 124) (2).

Sumter Co.: Wet woods near Leslie, July 23, 1901, *R. M. Harper* (no. 1104) (2, 3, 4, 7).

FLORIDA

Hb. Geo. Thurber (3).

ALABAMA, Clay County

July 24, 1902 (Biltmore no. 490e) (5).

Tuscaloosa Co.: Vance Station, July 24, 1876 (12).

Lee Co.: Auburn, July 8, 1896, *F. S. Earle & C. F. Baker* (14); August 8, 1897, *Earle & Baker* (4, 14); August 11, 1897, *Earle & Baker* (14).

MISSISSIPPI, Simpsons County

Saratoga, August 4, 1903, *S. M. Tracy* (1).—Magee, August 4, 1903 (2).

Marion Co.: Poplarville, July 7, 1891, *S. M. Tracy* (2).

TENNESSEE, Carter County

Roan Mt., July 27, 1889, *F. Lamson-Scribner* (8).

Davidson Co.: Nashville, 1878, *Dr. A. Gattinger* (2).

Cocke Co.: Wolf Creek, August 23, 1897, *Thos. H. Kearney* (no. 907) (2). —Near Summit Max Patch, 4700 ft. alt., September 8, 1897, *Kearney* (no. 908) (2, 4).

Monroe Co.: White Cliff Springs, July, 1890, *F. Lamson-Scribner* (8).
Franklin Co.: Sewanee, August 1, 1878, *Gattinger* (3, 5, 8).
Carroll Co.: Hollow Rock, July 16, 1886, *Gattinger* (8).

OHIO, Lake County
Near Painesville, *Wm. C. Werner* (2).
Cuyahoga Co.: Near Cleveland, *Wm. Krebs* (1).
Medina Co.: Munson, July, 1897, *G. B. Ashcroft* (5).

INDIANA, Steuben County
In marsh ¼ mile east of Clear Lake, July 24, 1904, *Chas. C. Deam* (1).
Lake Co.: Pine, July 14, 1880, *T. J. Burrill* (1).
Randolph Co.: Swales, Clarke, July 15, 1896, *L. M. Umbach* (2, 5).

ILLINOIS, Cook County
August, 1869, *Henry H. Babcock* (4).
Cass Co.: Beardstown, *Chas. A. Geyer* (4).

MICHIGAN, Keweenaw County
Clifton, June, 1884, *O. A. Farwell* (11); woods, July, 1887, *Farwell* (no. 470) (3).
Marquette Co.: In wet sand near a bog, Turin, July 11, 1901, *Bronson Barlow* (1, 2).
Berrien Co.: Damp woods, St. Joseph, August 13, 1838, *Houghton* (3).

WISCONSIN
J. S. Smith (3).
Polk Co.: 1861, *T. J. Hale* (4).
St. Croix Co.: St. Croix, August, 1861, *Hale* (4, 16).
Brown Co.: Big Suamico woods near the shore, July 11, 1886, *J. H. Schuette* (1).
Columbia Co.: Kilbourn, 1861, *Hale* (3, 4).

MINNESOTA, Aitkin County
Nichols, June, 1892, *E. P. Sheldon* (5).
Chisago Co.: Center City, June, 1892, *B. C. Taylor* (2, 5, 14).
Anoka Co.: Centreville, July 30, 1891, *Dr. J. H. Sandberg* (no. 708) (2).
Hennepin Co.: Moist meadow, July, 1890, *Sandberg* (5).

IOWA, Fayette County
"First reported from Iowa, rare," Wadena, July, 1893, *B. Fink* (2).

H. clavellata ARKANSAS, PULASKI COUNTY

Sandy swamp, south end of Main Street, Little Rock, July 9, 1887, *F. V. Coville* (no. 60) (2).

DALLAS Co.: Swamps, Hot Springs, July, *F. L. Harvey* (no. 75) (4, 10, 16).

LOUISIANA

Hb. C. W. Short (4).

BOSSIER Co.: Alden Bridge, November 2, 1898, *Wm. Trelease* (4).

RAPIDES Co.: Common along pine wood streams, vicinity of Alexandria, June 6, 1899, *Carleton R. Ball* (no. 564) (2, 3, 4, 5, 6).

H. albida 3. **H. albida** *R. Br.*, Prodr. 312 (1810) nomen, in Ait. Hort. Kew. ed. 2, 5: 193 (1813), Miscellaneous Bot. 2: 477; *Sw.*, Summa Veg. Scand. 32 (1814), Svenska Bot. 8: 507, f. 1 (1819); *Hook.*, in Curt. Fl. Lond. ed. 2, 4: t. 99 (1821); *Hook.*, Fl. Scot. pt. 1, 252, pt. 2, 188 (1821); *Lindl.*, in Donn's Hort. Cant. ed. 10, 332 (1823); *Lodd.*, Bot. Cab. 12: t. 1121 (1826); *Reichb.*, Fl. Germ. exc. 130 (1830); *A. Dietr.*, Fl. Bor. 1: t. 67 (1833); *Hook.*, Brit. Fl. ed. 4, 1: 315 (1838), ed. 5, 369 (1842); *Deak.*, Florigr. Brit. 3: 1113, f. 1332 (1847); *Hook. & Arn.*, Brit. Fl. ed. 6, 423 (1850); *Lindsay*, Edinb. Bot. Soc. Trans. 7: 143 (1863); *Benth.*, Handb. Brit. Fl. ed. 2, 825, fig. 995 (1865); *Pratt*, Fl. Pl. & Ferns Gt. Brit. 5: 214, t. 217, fig. 2; *Watson*, Topog. Bot. ed. 2, 398 (1883); *Webst.*, Brit. Orch. 73 (1886); *Painter*, in Journ. Bot. 27: 179 (1889); *Williams*, Orch. Grow. Man. ed. 7, 417 (1894); *Hanb. & Marsh.*, Fl. Kent 337 (1899); *Aveb.*, Brit. Fl. Pl. 406 (1905); *Ley*, in Journ. Bot. 45: 326 (1907).

Orchis palmata palmis inversis, flore albo *Loes.*, Fl. Pruss. 182 (1703).

Limodorum montanum, flore ex albo dilute virescente *Chom.*, Mem. de l'Acad. Roy. des Sci. 392, pl. 8 (1705).

Orchis palmata, angustifolia, Alpina, flore albo *Tourn.*, Inst. 1: 486 (1719); *Martyn*, in Tourn. Compleat Herbal 2: 544 (1780).—**O. palmata thyrso specioso** &c. *Dill.*, in Ray Syn. ed. 3, 332 (1724). *H. albida*

Pseudo-Orchis Alpina, flore herbaceo *Mich.*, Gen. 30, t. 26 A-C (1729); *Segu.*, Ver. Supp. 254 (1754).

Satyrium bulbis fasciculatis, foliis lanceolatis, nectarii labio trifido acuto; intermedio majore *L.*, Act. Ups. 19 (1740), Fl. Suec. ed. 1, 263, no. 733 (1745), ed. 2, 314 (1755).

Orchis palmata alpina, spica densa, albo-viridi, *Hall.*, Opusc. 148 (1749).

Satyrium scanense *L.*, It. Scan. 158 (1751); *Steud.*, Nomencl. ed. 1, 734 (1821).—**S. albidum** *L.*, Sp. Pl. ed. 1, 944 (1753), Sp. Pl. ed. 2, 1338 (1763); Fl. Suec. ed. 2, 314 (1755), Syst. ed. 14, 812 (1784); *Huds.*, Fl. Angl. 337 (1762); *Lam.*, Fl. Fr. 3: 512 (1778); *Pers.*, Syn. 2: 506 (1807).

Helleborine Broccenbergensis *Riv.*, Hex. t. 8 (1760).

Orchis radicibus, confertis, teretibus, calcare brevissimo, labello trifido *Hall.*, Hist. Helv. 2: 137, t. 26 (1768).

Orchis alpina *Crantz*, Stirp. Austr. 486 (1769).—**O. albida** *Scop.*, Fl. Carn. ed. 2, 2: 201 (1771), not *Frivald; Oed.*, Fl. Danica t. 115 (1766); *Allioni*, Fl. Ped. 2: 149 (1785); *Sw.*, in Act. Holm. 21: 207 (1800); *DC.*, Fl. Fr. ed. 3, 3: 258 (1805); *Willd.*, Sp. Pl. 4: 38 (1805); *Wahlenb.*, Fl. Lapp. 216 (1812); *Pollini*, Fl. Veron. 3: 21 (1824); *DC.*, Bot. Gal. ed. 2, 443 (1828); *Smith*, Engl. Fl. 4: 18 (1828); *Gaudin*, Fl. Helv. 5: 452 (1829); *Host*, Fl. Austr. 2: 534 (1831); *Anonymous*, Irish Flora 172 (1833); *Woods*, Tourist's Fl. 353 (1850); *Gren. & Godr.*, Fl. Fr. 3: 299 (1855).

Satyrium trifidum *Vill.*, Hist. Pl. Dauph. 2: 42 (1787).

Orchis parviflora *Poir.*, in Lam. Encyc. 4: 599 (1797).

Sieberia albida *Spreng.*, Anleit. 2: 380 (1818).

H. albida **Gymnadenia albida** *L. C. Rich.*, in Mém. Mus. Par. 4: 57 (1818); *Spreng.*, Syst. Veg. 3: 694 (1826); *Nees von Esenb.*, Gen. 3, f. 10 (1833); *Bluff & Fing.*, Comp. ed. 2, 2: 581 (1836–8); *Koch*, Syn. ed. 2, pt. 2, 794 (1844); *Brebis.*, Fl. Norm. ed. 2, 259 (1849); *Reichb. f.*, Orch. Eur. 110, 179, t. 67 (419) (1851); *Ambr.*, Fl. Tir. Aust. 1: 702 (1854); *Thiel.*, in Bull. Soc. roy. Belg. 12: 91 (1873); *Bab.*, Man. Brit. Bot. ed. 8, 346 (1881); *Purchas & Ley*, Fl. Heref. 298 (1889); *M. Schulze*, Orch. Deutsch.-Oesterr. u. der Schw. t. 46 (1894); *Warren*, Fl. Cheshire 299 (1899); *Correvon*, Alb. des Orch. 67, t. 18 (1899).

Cœloglossum albidum *Hartm.*, Handb. Skand. Fl. ed. 1, 329 (1820); *Fries*, Fl. Scan. 165 (1835); *Hartm.*, Handb. ed. 3, 205 (1838); *Camus*, Mon. Orch. Fr. 79 (1892); *Bennett*, Fl. Alps 2: 139 (1897); *Chen. & Braun*, in Bull. Herb. Boiss. 7: 419, 472 (1907).

Entaticus albidus *S. F. Gray*, Nat. Arr. Brit. Pl. 2: 198 (1821).

Chamorchis albida *Dumort.*, Prodr. Fl. Belg. 133 (1827); *Michot*, Fl. Hain. 279 (1845).

Platanthera albida *Lindl.*, Syn. Brit. Fl. ed. 1, 261 (1829).

Peristylus albidus *Lindl.*, Syn. Brit. Fl. ed. 2, 261 (1835), Gen. & Sp. Orch. 299 (1835); *Steud.*, Nomencl. ed. 2, 2: 305 (1841); *Baxter*, Brit. Bot. 5: 387 (1834–43 according to Pritzel); *Bertol.*, Fl. Ital. 9: 572 (1853); *Ledeb.*, Fl. Ross. 4: 73 (1853); *Hook. f.*, in Journ. Linn. Soc. 1: 117 (1857).

Bicchia albida *Parl.*, Fl. Ital. 3: 397 (1858); *Barla*, Ic. Orch. 28, t. 11, f. 1–16 (1868).

Leucorchis albida *E. Meyer*, ex Schur Enum. Pl. Transsilv. 645 (1866).—**L. lucida** *Fuss*, Fl. Transs. 625 (1866).

Orchis alsaticus *Herm.*, Fl. Als. (according to Thielens in Bull. Soc. roy. Belg.).

Satyrium albidum: *H. albida*

"4. SATYRIUM bulbis fasciculatis, foliis lanceolatis, nectarii labio trifido acuto: intermedia majore. *Act. ups. 1740, p. 19. Fl. suec. 733.*

"Satyrium scanense. *It. scan. 153.**

"Orchis palmata alpina, spica densa albo viridi. *Hall. It. herc. 68.*

"Pseudo Orchis alpina, flore herbaceo. *Mich. gen. 30, t. 26.*

"Limodorum montanum, flore albo dilute virescente.

"*Chom. act. paris. 1705, p. 517.*

"*Habitat in* Scaniæ, Germaniæ, Helvetiæ, Averniæ *Pratis sylvaticis* ♃." L. Sp. Pl. 944.

GREENLAND

Hartz, July 11, 1889 (3).—Fox Havn in Arsuk Fjord, June 24, 1888, *Dr. L. Kolderup Rosenvinge* (6).—Julianehaab, 1899, *Rink* (3).—Pale pinkish yellow, sweet scented, rich damp soil brook banks, Godhavn, Disko I., August 4, 1878, *L. Krumlein* in Howgate Polar Expedition (3).—Boreal Disko, 1870, *Bryssen* (3).—Also from numerous localities in Europe. Distributed from Ural Siberia through northern Europe and mountains to Switzerland, England, Iceland, and Greenland. Probably in Arctic America.

I have been unable to discover a single authentic specimen of *Habenaria albida* from our range. If it occurs on the North American mainland it must be extremely rare and local. The labellum is variously trifid or 3-lobed, the middle lobe being longer and larger than the lateral ones.

4. **H. flava** (*L.*) *Spreng.*, Syst. Veg. 3: 691 (1826); *Gray*, in Sill. Journ. 38: 308 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *R. Br.*, Prodr. 312 (1810) nomen; *Britton*, Cat. N. J. 234 (1889); *Coulter*, Fl. West. Tex. 425 (1891); *MacMillan*, Metasp. Minn. Val. 168 (1892); *Morong*, in Bull. Torr. Bot. Cl. 20: 38 (1893); *Britton & Br.*, Ill. Fl. 1: 464, f. 1105 (1896); *Millsp. & Nutt.*, Fl. W. Va. 200 (1896); *Clute*, Fl. Up. Susq. 105 *H. flava*

H. flava (1898); *Mohr*, Pl. Life Ala. 454 (1901); *Gattinger*, Fl. Tenn. 62 (1901); *Jelliffe*, Gibson's Nat. Orch. 45, t. 21 (1905).

Orchis radice palmata floribus obsolete luteis &c. *Clayton*, no. 689.—**O. bulbis palmatis, nectarii cornu filiformi longitudine germinis, labio trifido integerrimo** *Gron.*, Fl. Virg. ed. 1, 188 (1739).—**O. radicibus palmatis: nectarii labio trifido &c.** *Gron.*, Fl. Virg. ed. 2, 137 (1762).

Orchis flava *L.*, Sp. Pl. ed. 1, 942 (1753), ed. 2, 1336 (1763); *Forst.*, Pl. N. A. 39 (1771); *Poir.*, in Lam. Encyc. 4: 598 (1797) excl. syn.; *Sw.*, in Act. Holm. 21: 207 (1800); *Willd.*, Sp. Pl. 4: 33 (1805), excl. syn. Mor. Hist.; *Pers.*, Syn. 2: 505 (1807); *Martyn*, in Mill. Dict. ed. 9, 2: no. 39 (1807); *Pursh*, Fl. 2: 586 (1814); *Eaton*, Man. ed. 4, 374 (1824); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 29, 533 (1853), ed. 41, 533 (1856); *Provanch.*, Fl. Canad. 2: 566 (1862), not *O. flava* Nutt., Gen. 2: 188 (1818) nor Elliott, Sketch.—**O. virescens** *Muhl.*, ex Willd. Sp. Pl. 4: 37 (1805); *Nutt.* Gen. 2: 189 (1818); *Eaton*, Man. ed. 4, 375 (1824), not *O. virescens* Zollik., in Gaud. Fl. Helv.

Satyrium virescens *Pers.*, Syn. 2: 507 (1807).

Habenaria herbiola *R. Br.*, in Ait. Hort. Kew. ed. 2, 5: 193 (1813); *Lindl.*, in Donn's Hort. Cant. ed. 10, 332 (1823); *Spreng.*, Syst. Veg. 3: 688 (1826); *Torr.*, Comp. 318 (1826); *Beck*, Bot. ed. 1, 347 (1833); *Gray*, in Ann. Lyc. Nat. Hist. N. Y. 3: 232 (1836); *Darl.*, Fl. Cestr. ed. 1, 506 (1837); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840).

Orchis herbiola *Pursh*, Fl. 2: suppl. 748 (1814); *Big.*, Fl. Bost. ed. 3, 341 (1840).—**O. fuscescens** *Pursh*, Fl. 2: 587 (1814); *Nutt.*, Gen. 2: 189 (1818); *Elliott*, Sketch 2: 487 (1824); *Eaton*, Man. ed. 4, 375 (1824); *Lodd.*, Bot. Cab. t. 1748 (1832), not *O. fuscescens* Gmel. (*H. fuscescens*) nor L.—**O. flava** VAR. **virescens** *Green*, Cat. N. Y. 120 (1814).—**O. bidentata** *Elliott*, Sketch 2:

H. flava

488 (1824); *Eaton & Wr.*, N. A. Bot. ed. 8, 334 (1840); *Darby*, Bot. S. St. 526 (1866).—? **O. glareosa** *Raf.*, in Atl. Journ. 150 (1832).

Habenaria fuscescens *Torr.*, Comp. 318 (1826); *Beck*, Bot. ed. 1, 349 (1833); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840); *Darby*, Bot. S. St. 527 (1866).—**H. virescens** *Spreng.*, Syst. Veg. 3: 688 (1826) as to syn.; *Sw.*, Adnot. Bot. 46 (1829); *Beck*, Bot. ed. 1, 347 (1833); *Gray*, Man. ed. 5, 499 (1867), ed. 6, 507 (1890); *Gray*, Field, For. & Gard. Bot. ed. 1, 325 (1868), rev. ed. 408 (1895); *Hall*, in Bull. Torr. Bot. Cl. 4: 14 (1873); *Willis*, Cat. N. J. 61 (1874); Yale Cat. 45 (1878); *J. Robinson*, Fl. Essex Co. 107 (1880); *Gray*, in Bot. Gaz. 5: 63 (1880); *Britton*, Prel. Cat. N. J. 94 (1881); *Ward*, Fl. Wash. 119 (1881); Pl. Mald. & Medf. 11 (1881); *Day*, Pl. Buffalo 139 (1882); *Perkins*, Gen. Cat. Vt. 37 (1882); *Jackson*, Fl. Worcester Co. 32 (1883); *Upham*, Fl. Minn. 139 (1884); *Tracy*, Fl. Mo. 84 (1886); *Brendel*, Fl. Peor. 60 (1887); *Gattinger*, Tenn. Fl. 33 (1887); *Dame & Collins*, Fl. Middlesex 102 (1888); *Bennett*, Pl. R. I. 43 (1888); *Macoun*, Cat. 4: 13 (1888); *Macoun*, Check-list 53 (1889); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Fernald*, in Portl. Cat. 64 (1892); *Baldw.*, Orch. N. Eng. 98, fig. 29 (1894); *Galen*, Fl. Lanc. Co. 15 (1898); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Andrews*, in Rho. 2: 114 (1900); *Knowlton*, in Rho. 2: 124 (1900); *Williams*, in Rho. 4: 18 (1902); *Bissell & Andrews*, Fl. Southington 36 (1902); *Mathews*, Field-book, 84, fig. (1902); *L. O. Eaton*, in Rho. 5: 82 (1903).

Orchis scutellata *Nutt.*, in Trans. Am. Phil. Soc. n. s. 5: 161 (1834).

Platanthera herbiola *Lindl.*, Gen. & Sp. Orch. 287 (1835); *Hooker*, Fl. Bor. Am. 2: 197 (1839); *Steud.*, Nomencl. ed. 2, 2:

H. mesodactyla *bracts* ovate-lanceolate, acuminate, *little exceeded by the* incurved *ovary;* perigonial divisions exterior lateral reflexed, oblong-lanceolate, superior deltoid, 2 interior 2-partite: their anterior segments setaceous, twice as long as the linear posterior ones; *lip 3-partite: segments filiform: middle twice as long as the lateral ones: spur little shorter than the ovary,* filiform, somewhat clavate, *descending;* appendages of the stigma short, thickish, rounded. —Nearly allied to the preceding,[1] with which it grows intermingled (*Cr.*), and some characters depend perhaps upon the more advanced state of development in which this was collected. Habit and proportions the same, but stem rather higher, flowers more distant, and lip-segments narrower.—HAB. Trinidad, *Cr.*, in savannahs, Piarco." Griseb. *loc. cit.*

I have seen no specimens of this species. In my herbarium there is an excellent sketch of the material in the Kew Herbarium, for which I am indebted to the kindness of Dr. D. Prain. This sketch shows a slender plant with wand-like stems and linear, bract-like leaves. The inflorescence is loose, somewhat one-sided, and few-flowered. Contrary to the description published by Grisebach, the middle division of the labellum, as shown by the sketch, is much shorter than the lateral divisions. The material from which the sketch was prepared was collected in Trinidad by Dr. Crueger, and was used by Grisebach in his work on the *Flora of the British West Indian Islands;* consequently the discrepancy between the description and the material at Kew is of unusual interest.

Kränzlin, in *Orchidacearum Genera et Species*, states that the anterior division of the petals is longer than the posterior division, but not twice longer, as described by Grisebach, and he describes the labellum as tripartite, with the middle division about twice as long as the lateral ones. (PLATE 70.)

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[1] *H. setacea*, which Cogniaux has described as *H. Cruegeri.*

specifically or even varietally distinct from one another is very doubtful. The specimens in the Linnæan and Gronovian herbaria are comparable to the specimens with elongated racemes frequently found in the South and Southwest. The specimen in Lindley's herbarium at Kew which represents *Platanthera herbiola* Lindl. is comparable to the form with congested racemes not uncommon in the New England states. The erect horn on the labellum of this species is very characteristic. *H. flava*

NOVA SCOTIA, Guysborough County
Low places along the river, Boylston, July, 1891, *Dr. Chas. A. Hamilton* (2, 3, 6).

QUEBEC
By outlet of Lake Champlain, July 20, 1878, *C. G. Pringle* (7).

ONTARIO, Hastings County
Meadows along Crow River, July 18, 1867, *J. Macoun* (6, 16).
Wellington Co.: Wet woods, Snell's Lake, Edmonton, July 4, 1891, *Jas. White* (6).
Lincoln Co.: Woods near the Whirlpool, July 1, 1894, *R. Cameron* (6).
Essex Co.: Sandwich, June 22, 1860, *Wm. Boott* (3).

MAINE, Piscataquis County
Howard, *Susan M. Hallowell* (2).
Franklin Co.: Dry field, poor soil, Chesterville, July 18, 1902, *C. H. Knowlton* (1); sterile field, South Chesterville, July 15, 1902, *Lillian C Eaton* (1).
York Co.: North Parsonsfield, July 2, 1902, *R. G. Leavitt* (1).

NEW HAMPSHIRE, Rockingham County
Hampton Falls, July 12, 1896, *A. A. Eaton* (1).

VERMONT, Franklin County
Highgate Springs, July 25, 1901, *E. Brainerd* (1).
Windham Co.: Banks of West River, South Londonderry, July 4, 1895, *W. W. Eggleston* (3, 5).

MASSACHUSETTS, Essex County
Ipswich, *Oakes* (4); bogs, Ipswich, July 7, 1876, *Thos. Morong* (8); wet meadows among grass, Ipswich, July, 1875, *Morong* (2).

H. flava MIDDLESEX Co.: Meadow, foot of Ball's Hill, July 13, 1893, *Walter Deane* (1, 3).—A wet swale near Iron Pond, Woburn, July 2, 1871, *Wm. Boott* (3).

SUFFOLK Co.: Spring St., meadow, West Roxbury, June 26 and July 2, 1888, *Faxon* (2, 3).

PLYMOUTH Co.: Egypt, July 10, 1900, *J. G. Hall* (1).—Brockton, June 24, 1902, *Carl Blomberg* (1).

BRISTOL Co.: North Easton, July, 1889, *Blomberg* (1); July 4, 1904, *Blomberg* (1); June 19, 1902, *Blomberg* (1).—Damp meadow, July 25, 1905, *A. A. Eaton* (1).—Along Canoe River, common, Norton, June 11, 1905, *O. Ames* (1).

RHODE ISLAND, PROVIDENCE COUNTY

Cranston, June, 1844, *Geo. Thurber* (3).

CONNECTICUT

Chas. Wright (4).

HARTFORD Co.: East Hartford, 1900, *A. W. Driggs* (3).—Low meadows Southington, July 8, 1893, *C. H. Bissell* (no. 579) (3).

MIDDLESEX Co.: Middletown, June, 1835, *S. B. Buckley* (4).

NEW HAVEN Co.: New Haven, *D. C. Eaton* (5); June 30, 1885, *A. L. Winton* (3).

FAIRFIELD Co.: Green's Farms, June 22, 1894, *C. L. Pollard* (no. 79) (2).

NEW YORK

Salt marsh, Long Island, June 16, 1877, *Addison Brown* (16).

JEFFERSON Co.: Black River, July 26, 1887, *J. Porter* (6).—Watertown, *A. Gray* (3).

OSWEGO Co.: Lake Neahtowanah, Fulton, June 30, 1887, *W. W. Rowlee* (4); June 30, 1887, *F. V. Coville* (2).

ONONDAGA Co.: Near Syracuse, *T. Marshall Fry* (1).

MADISON Co.: Low meadow, among bushes and weeds near Oneida Creek, August, 1903, *H. D. House* (18).

QUEENS Co.: Damp sultry place, Inwood, May, 1865, *W. W. Denslow* (6).

NEW JERSEY

High Point, July 4, 1890, *Dr. & Mrs. N. L. Britton* (6).

SUSSEX Co.: Wet meadows, Cranberry Lake, June 26, 1904, *Kenneth K. Mackenzie* (no. 783) (1).

BERGEN Co.: Meadows, Closter, June 17, 1865, *C. F. Parker* (4).

ESSEX Co.: Millburn, July, 1879, *H. H. Rusby* (10).

PENNSYLVANIA, Lancaster County
Pleasant Grove, June 19, 1889, *John K. Small* (6).
Chester Co.: Meadows, June, 1861, *Wm. M. Canby* (16).—West Chester, *T. S. D.* (?) (4).
Delaware Co.: (2).

DELAWARE, New Castle County
Meadows, Granogue, June 29, 1894, *E. Tatnall* (3).—Meadows on Red Clay Creek above Falkland, June, 1874, *Wm. M. Canby* (16).

DISTRICT OF COLUMBIA
Wet woods on Eastern Branch at Bennings, July 15, 1899, *E. S. Steele* (2); June 16, 1881, *L. F. Ward* (2).—*In vicinis* Washington, August, 1878, *J. W. Chickering, Jr.* (6); June 20, 1880, *L. F. Ward* (2).

VIRGINIA, Alexandria County
Hunting Creek, June 15, 1879, *Lester F. Ward* (2); June 20, 1880, *Ward* (2, 8).—Hunting Creek and Mt. Vernon Road, Alexandria, August 28, 1904, *Philip Dowell* (no. 3317) (2).

NORTH CAROLINA, Buncombe County
Wet places, Biltmore, June 5, 1896 (Biltmore no. 1218) (2, 4, 5).—Mountain bogs (2500 ft. elevation) near Biltmore, June 22, 1897 (Biltmore no. 1218b) (2, 3, 4, 5).
Jackson Co.: Cullowhee, 1887, *Roland Thaxter* (3).

SOUTH CAROLINA, Berkeley County
Santee Canal, July, *H. W. Ravenel* (3).

GEORGIA
Chapman (4).
Floyd Co.: Rome, *Chapman* (5).
Early Co.: Swamp of Blue Creek about 4 miles southeast of Blakely, August 1, 1903, *Roland M. Harper* (no. 1909) (1).
Dekalb Co.: Woods near East Lake, alt. 1025 ft., July 14, 1900, *Percy Wilson* (no. 54) (2).
Chatham Co.: (*H. calycina* n. sp.) *in sylvis at ripes fl.* Savannah (Hb. Bernhardi) (4).
Sumter Co.: Muckalee Creek, swamp above Americus, July 30, 1901, *Harper* (no. 1141) (2, 4).

FLORIDA, Duval County
Wooded tidal swamps, May (1877?), *A. H. Curtiss* (no. 2776) (3, 4).—

H. flava Swamp near Jacksonville, May 19, 1894, *A. H. Curtiss* (no. 4775) (2).

Franklin Co.: Common in marshes, Apalachicola, August 14, 1897, *B. F. Bush* (no. 89) (4).

St. John Co.: "'The southern form with only two large leaves,' *Chapm.*" —Head of Pellicier's Creek, August 31, 188–, *Miss Reynolds* (16).

Levy Co.: Wet cypress swamps, Gulf Hammock, 1877, *A. P. Garber* (no. 191) (3); November, 1877, *Garber* (no. 311) (5, 16).

Orange Co.: Oviedo, first week in November, 1903, *T. L. Mead* (1).

ALABAMA, Lee County

Rich woods, Auburn, May 9, 1896, *F. S. Earle & L. M. Underwood* (12).

TENNESSEE, Chester County

Bottoms, Henderson, August, 1892, *S. M. Bain* (no. 137) (2, 8).

WEST VIRGINIA, Summers County

Meadows near Barger's Spring, July 13, 1900, *E. L. Morris* (no. 981) (2).

OHIO, Lorain County

Oberlin, July 1, 1894 (1).

Wayne Co.: Copley Swamp, Akron, June 30, 1889, *Dr. Kent O. Foltz* (2).

INDIANA

Barrens of Indiana, 1840, *C. W. Short, M.D.* (4).—Swales, Miller's, June 27, 1899, *L. M. Umbach* (2).

Steuben Co.: West side of Long Lake in open marsh, one mile east of Clear Lake, July 4, 1904, *Chas. C. Deam* (1).

Noble Co.: In low place near Rome City, July 21, 1904, *Deam* (1).

Fountain Co.: August, 1869, Hb. Canby (16).

ILLINOIS, Ogle County

Oregon, July 25, 1885, *Merton B. Waite* (1, 11).

Cook Co.: July, 1869, *Henry H. Babcock* (4).

MICHIGAN, Kent County

Grand Rapids, June 22, 1895, *W. E. Mulliken* (5).

Wayne Co.: Woods at Detroit, rare, June 17, 1895, *O. A. Farwell* (no. 1501) (11).

Branch Co.: Algonac, August, 1884, *A. B. Lyons* (2, 10).

WISCONSIN, Brown County

Big Suamico, July 22, 1888, *J. H. Schuette* (1).

H. flava

MINNESOTA

St. Anthony Park, July 22, 1888, *J. H. Schuette* (1).

Chisago Co.: Center City, June, 1892, *B. C. Taylor* (1).

Goodhue Co.: Zumbrota, July, 1892, *A. L. Ballard* (2, 5, 14).

MISSOURI, St. Louis County

St. Louis, August 5, 1892, *H. Eggert* (4). Behind Forest Park, July 6, *Eggert* (4).—Dry barren hills below Jefferson Barracks on the Mississippi, 1846, *N. Riehl* (4).

Shannon Co.: Sandy places, uncommon, July 22, 1891, *B. F. Bush* (no. 1467) (4).

Howell Co.: August 13, 1892, *B. F. Bush* (4).

LOUISIANA

Hb. Thurber (3).—Red River, *Hale* (?) (3).

TEXAS

Drummond (no. 402) (3).

Upshur Co.: Common in swamp, Big Sandy, May 28, 1901, *J. Reverchon* (Bush no. 2484) (4).

H. integra

5. **H. integra** (*Nutt.*) *Spreng.*, Syst. Veg. 3: 689 (1826); *Torr.*, Comp. 317 (1826); *Beck*, Bot. ed. 1, 348 (1833); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840); *Gray*, in Sill. Journ. 38: 309 (1840); *Gray*, Man. ed. 5, 499 (1867), ed. 6, 506 (1889), Field, For. & Gard. Bot. 325 (1868), rev. ed., 407 (1895); *Willis*, Cat. N. J. 61 (1874); *Britton*, Prel. Cat. N. J. 94 (1881); *Gattinger*, Tenn. Fl. 88 (1887); *Britton*, Cat. N. J. 234 (1889); *Britton & Br.*, Ill. Fl. 1: 463, f. 1102 (1896); *Gattinger*, Fl. Tenn. 62 (1901); *Mohr*, Pl. Life Ala. 454 (1901); *Jelliffe*, Gibson's Nat. Orch. 35, 41, t. 16, f. 2 (1905). (Self-fertilized, see Bull. Torr. Bot. Cl. 20: 33.)

Orchis integra *Nutt.*, Gen. 2: 188 (1818); *Wood*, Class-book ed. 41, 533 (1856).—**O. flava** *Nutt.*, Gen. 2: 188 (1818), not *L.; Elliott*, Sketch 2: 485 (1824); *Torr.*, Comp. 317 (1826). —**O. crocea** *Raf.*, in Atl. Journ. 119 (1832).[1]

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[1] There can be no doubt that Rafinesque's *Orchis crocea* is a synonym of this species, as the description fits it well, and as there is no other species with saffron-colored flowers and entire lip. His description is as follows:

H. integra **Habenaria Elliottii** *Beck*, Bot. ed. 1, 348 (1833), not *Rolfe; Darby*, Bot. S. St. 527 (1866).

Gymnadenia flava *Lindl.*, Gen. & Sp. Orch. 279 (1835); *Steud.*,. Nomencl. ed. 2, 1: 712 (1841); *Gray*, Man. ed. 1, 469 (1848), ed. 2, 444 (1856); ed. 3, 444 (1859); *Chapm.*, Fl. S. U. S. ed. 1, 459 (1860), ed. 2, 459 (1884), ed. 3, 485 (1897).

Platanthera integra *Beck*, Bot. ed. 2, 348 (1856).—**P. flava** *Wood*, Class-book, 683 (1861)[1] in part (?).

Gymnadeniopsis integra *Rydb.*, in Britton's Man. 298 (1901); *Small*, Fl. Se. U. S. 316 (1903).

Platanthera fuscescens *Kränzl.*, Orch. Gen. et Sp. 1: 948 (1901) in part, not *Orchis fuscescens* L. (*Perularia fuscescens* Lindl.) nor *Habenaria flava* Spreng.

"4. **integra.* Lip oblong, entire, longer than the inner petals; spur longer than the germ, acute at the point; stem leafy, bractes shorter than the flowers. HAB. In the swamps of New Jersey. Nearly allied to *O. ciliaris* and with flowers of the same orange-yellow colour, but somewhat smaller.

"6. *flava.* Lip ovate, entire, partly crenulate; spur attenuated, filiform and about the length of the germ; spike crowded; bractes longer than the flowers. HAB. In New Jersey, Z. Collins. *v. s.* In herb. Collins and Muhlenberg. Flowers pale orange-yellow, rather small. Spur widening above." Nutt. *loc. cit.*

The Muhlenberg specimens, and also those cited by Elliott, are undoubtedly *H. integra*, as a specimen in Hb. Elliott sent to him by Muhlenberg is this species.

"*Orchis* (or *Habenaria*) *crocea* Raf. Stem angular, leaves lanceolate acuminate, spike short cylindrical, bracts lanceolate equal to flowers, spur slender equal to ovary, petals ovate acute, labellum nearly similar hardly longer, entire.

"Discovered and collected by D. W. Fisher. Very different from *O. ciliaris*, flowers smaller, saffron color, not ciliated. Slender plant 15 inches high. Probably an Habenaria." (A. A. E.)

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[1] Wood cites *O. flava* and *O. nigra* Nutt. as synonyms. Doubtless *nigra* is a misprint for *integra*. (A. A. E.)

NEW JERSEY

Muhlenberg (13).—1864, *Wm. M. Canby* (3).—*Austin* (5).—Pine barrens, *D. C. Eaton* (6).

Burlington Co.: Low pine barrens, Atsion, September, 1862, *Wm. M. Canby* (16).—Quaker Bridge, 1833 (3) (*Habenaria Elliottii* Beck).—Swamps, August 26, 1863, *C. F. Parker* (7); August, 1866, *Parker* (4); September 3, 1867, *Parker* (3).

NORTH CAROLINA, Rowan County

Dun's Mountain, August 18–27, 1894, *John K. Small* (4).

Brunswick Co.: Low pine barrens, August 15, 1884, *McCarthy* (2).

SOUTH CAROLINA

1848, *Met Curtis* (4).—*Dr. Schweinitz* (13).

GEORGIA, Worth County

Vicinity of Poulan, August 14–18, 1900, *Pollard & Maxon* (no. 567) (2).

Colquitt Co.: Wet pine barrens about 3½ miles south of Moultrie, August 25, 1903, *R. M. Harper* (no. 1948) (1).

Charlton Co.: Sphagnous bog about 2 miles east of Folkston, August 12, 1902, *Harper* (no. 1507) (2, 3, 4).

FLORIDA

1846, *Chapman* (4).—*Torrey* (20).

Calhoun Co.: Wewahitchka, *Chapman* (4).

ALABAMA

Drummond (20).

Randolph Co.: Damp, piney woods, Pinetucky, September 10, 1874, *Dr. E. A. Smith* (12).

Baldwin Co.: Low damp pine barrens near Fish River, July, 1878, *C. Mohr* (12).

MISSISSIPPI

Tchontica Bouffe, August 22, 1898, *S. M. Tracy* (no. 5080) (2, 4, 14).

Jackson Co.: Not common, Ocean Springs, July 27, 1896, *C. L. Pollard* (no. 1057) (2, 3, 4).—August 19, 1895, *J. Skehan* (4).

LOUISIANA, Orleans County

New Orleans, *Drummond* (3, 19).—Prairies, Lake Charles, September, 1906, *R. S. Cocks* (no. 3125) (3).

TEXAS

Drummond (no. 406) (3).

H. integra TENNESSEE

Met Curtis (4).
Sumner Co.: Mitchellville, September, 1883, *Dr. A. Gattinger* (8).
Davidson Co.: Nashville, *Gattinger* (16).
Coffee Co.: Tullahoma, August, 1867, *Gattinger* (2, 8).

H. nivea 6. **Habenaria nivea** (*Nutt.*) *Spreng.*, Syst. Veg. 3: 689 (1826); *Gray*, Man. ed. 6, 507 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 407 (1895); *Hall*, Pl. Tex. 23 (1873); *Britton & Br.*, Ill. Fl. 1: 462, f. 1099 (1896); *Harper*, in Bull. Torr. Bot. Cl. 27: 423, 424 (1900); *Mohr*, Pl. Life Ala. 454 (1901); *Jelliffe*, Gibson's Nat. Orch. 34, t. 16, f. 1 & 3 (1905). (Self-fertilized Bull. Torr. Bot. Cl. 20: 33.)

Orchis nivea *Nutt.*, Gen. 2: 188 (1818); *Elliott*, Sketch 2: 485 (1824); *Eaton & Wr.*, N. A. Bot. ed. 8, 334 (1840).

Gymnadenia conica Lindl., Gen. & Sp. Orch. 280 (1835); *Steud.*, Nomencl. ed. 2, 1: 711 (1841); *Correvon*, Orch. Rust. 90 (1893).—**G. nivea** *Lindl.*, Gen. & Sp. Orch. 280 (1835) (not *G. orchidis*, as suggested in Index Kewensis); *Steud.*, Nomencl. ed. 2, 1: 712 (1841); *Engelm. & Gray*, in Bost. Journ. Nat. Hist. 5: 236 (1845); *Chapm.*, Fl. S. U. S. ed. 1, 459 (1860), ed. 2, 459 (1884), ed. 3, 485 (1897); *Wood*, Class-book, 682 (1861); *Correvon*, Orch. Rust. 93 (1893).

Peristylus niveus *Kränzl.*, Orch. Gen. et Sp. 1: 520 (1898), 926 (1901).

Gymnadeniopsis nivea *Rydb.*, in Britton's Man. 298 (1901); *Small*, Fl. Se. U. S. 316 (1903); *Bayard Long*, in Torreya 8: 16 (1908).

"5. **nivea*. Lip linear-oblong, entire, longer than the inner petals; spur filiform, equal, longer than the germ; segments of the corolla spreading; spike short and oblong; lower leaves linear and very long, cauline subulate. Hab. Betwixt St. Mary's and Satilla river, West Florida.—Dr. Baldwyn, who favoured me with a specimen under the above name. Flowers clear white, rather small. Lower leaves narrow, a span long, upper ones disproportionately small; bractes shorter than the germ. Genitaliferous column remarkably small in proportion, not half so large as the preceding,[1] the pollinia are consequently subsessile. Spike rather dense, 2 or 3 inches long." Nutt. *loc. cit.* *H. nivea*

Gymnadenia conica as represented in Lindley's herbarium at Kew is conspecific with *Habenaria nivea.* Lindley's tracing from a flower of the plant collected in Florida by Cozzens clearly represents *H. nivea.*

DELAWARE, Kent County
Savannas near Felton, August 30, 1867, *Wm. M. Canby* (3, 4, 5, 6, 16). —Felton, August, 1874 (2, 3); August, 1875 (2).

NORTH CAROLINA
Mountains, North Carolina, *S. B. Buckley* (4).
Pender Co.: Shady savanna, July 29, 1884, *G. McCarthy* (2, 16).
New Hanover Co.: Savannas near Wilmington, July 2, 1897 (Biltmore no. 5202 a) (2, 3, 5).

SOUTH CAROLINA
June, 1877, *Dr. Mellichamp* (4).
Berkeley Co.: Santee Canal, July, *H. W. Ravenel* (3).
Charleston Co.: Pine land near Whiteville, St. Johns, *Dr. F. P. Percher* (3).

GEORGIA
1845, *Boykin* (3); 1847, *Jones* (4).
Bulloch Co.: Rather dry pine barrens, June 26, 1901, *Roland M. Harper* (no. 964) (2, 3, 4); moist pine barrens, June 15, 1901, *Harper* (no. 892) (2).
Telfair Co.: Moist soil, McRae, June 6, 1900 (Biltmore no. 5202 c) (5).
Lee Co.: Leesburg, June 20, 1895, *F. S. Earle* (2).
Thomas Co.: Grassy pine barrens near Thomasville, August, 1902, *Mrs. A. P. Taylor* (1); "never really wet places," June 5 and July 23, 1903, *Mrs. Taylor* (1).

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[1] *Orchis integra.*

H. nivea FLORIDA

Buckley (3, 4).—*E. Rugel*, 1842–9, Field Col. Mus.—*Chapman* (2, 3, 4, 8, 10, 16).—1839, *Dr. Cooper* (3).

Santa Rosa Co.: Swamp near Milton, June 23, *A. H. Curtiss* (no. 32) (3).

Walton Co.: De Funiak, July, 1899, *P. H. Rolfs* (no. 254) (4).

Calhoun Co.: Swamps in pine barrens, Wewahitchka, May, 1896, *A. W. Chapman* (Biltmore no. 5202 a) (3, 4, 5).

Franklin Co.: Rivermarsh, Apalachicola, *Chapman* (Biltmore no. 5202) (5).

Duval Co.: Wet pine land, Baldwin, June 30, 1893, *P. H. Rolfs* (no. 208) (4).—San Pablo, June 20, 1897, *Rev. L. H. Lighthipe* (no. 439) (5).—Jacksonville, *A. H. Curtiss* (2).—Moist pine barrens near Jacksonville, June, 1877, *Curtiss* (no. 2767) (3, 4, 7, 8); June 6, 1894, *Curtiss* (no. 4937) (2, 5, 7, 14); June 9, 1898, *Curtiss* (no. 1696) (7); near Jacksonville, May 20, 1893, *Curtiss* (no. 4181) (2).

St. John Co.: Pine barren swamps, St. Augustine, June, July, 1875, *Mary C. Reynolds* (4, 10).

Orange Co.: Low pine woods and sphagnum bog, Oviedo, May 31, 1904, *A. A. Eaton* (no. 1026) (1).—Borders of depressions in sandy open prairies, Kissimmee, June 2, 1904, *Eaton* (no. 1066) (1).

Lake Co.: Eustis, May 28–June 15, 1895, *Geo. V. Nash* (no. 1927) (2, 3, 4, 10).

Lee Co.: Low sandy place, Ft. Myers, June 5, 1904, *A. A. Eaton* (no. 1096) (1); flat woods, Ft. Myers, June, 1895, *D. H. Webber* (no. 111) (4).—1903, *J. E. Layne* (1).

ALABAMA, Mobile County

Low open pine barrens, Mobile, July, 1878, *C. Mohr* (12).—Pine flats, May, 1905, *W. C. Dukes*.

MISSISSIPPI, Jackson County

Horn I., June 27, 1901, *S. M. Tracy* (no. 7530) (2, 3, 4).—Ocean Springs, June 11, 1895, *J. Skehan* (4); May 8, 1890, *Tracy* (2).

ARKANSAS, Arkansas County

Grand Prairie, July 4, *F. L. Harvey* (3).

LOUISIANA

Hale (3).—Low pine woods, Clearings, East Louisiana, May, 1883, *A. B. Langlois* (5).

Calcasieu Co.: Wet prairies, Calcasieu River, July, *Dr. Carpenter* (3).

TEXAS *H. nivea*

1843, *Lindheimer* (no. 190) (3, 4).
Waller Co.: Low places, Hempstead, 1872, *E. Hall* (no. 625) (2, 3, 4, 16).
Hardin Co.: Long-leaf pine belt, July, 1884, *G. C. Neally* (3).
Harris Co.: Six miles west of Houston, June, 1843, *Lindheimer* (?) (4).—
Cypress City, *Reverchon* (3).

7. **H. dilatata** (*Pursh*) *Hook.*, Exot. Fl. 2: t. 95 (Jan., 1825); *Spreng.*, Syst. Veg. 3: 688 (1826); *Torr.*, Comp. 318 (1826) in part; *Gray*, in Ann. Lyc. Nat. Hist. N. Y. 3: 231 (1834); *Eaton*, Man. ed. 7, 322 (1836); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Dewey*, Herbaceous Pl. Mass. 198 (1840); *Gray*, in Sill. Journ. 38: 311 (1840); *Gray*, Man. ed. 5, 500 (1867), ed. 6, 507 (1890); *Rothr.*, Alaska 456 (1867); *Gray*, Field, For. & Gard. Bot. 325 (1868), rev. ed. 407 (1895); *Rothr.*, Bot. Cent. Col. 51 (1874); *Porter & Coulter*, Syn. Fl. Col. 133 (1874); *Rothr.*, Bot. Wheeler 7, 17, 265 (1878); *Day*, Pl. Buffalo 139 (1882); *Perkins*, Gen. Cat. Vt. 37 (1882); *Upham*, Fl. Minn. 140 (1884); *Coulter*, Rocky Mt. Bot. 342 (1885); *Dudley*, Cayuga Fl. 95 (1886); *Dame & Collins*, Fl. Middlesex Co. 102 (1888); *Perkins*, Fl. Vt. 277 (1888); *Macoun*, Cat. 4: 15 (1888), Check-list 53 (1889); *Beal & Wheeler*, Fl. Mich. 607 (1891); *MacMillan*, Metasp. Minn. Val. 167 (1892); *Fernald*, in Portl. Cat. 64 (1892); *Baldw.*, Orch. N. Eng. 69, fig. 20 (1894); *Rand & Redf.*, Fl. Mt. Desert 153 (1894); *Holzinger*, in Contr. U. S. Nat. Herb. 3: 252 (1895); *Britton & Vail*, in Bull. Herb. Boiss. 3: 203 (1895); *Britton & Br.*, Ill. Fl. 1: 462, f. 1101 (1896); *Kearney*, in Bail. Cycl. Am. Hort. 2: 708 (1900); *Andrews*, in Rho. 2: 115 (1900); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Howell*, Fl. Nw. Amer. 628 (1902); *Mathews*, Field-book 86 (1902); *Andrews*, in Rho. 4: 80 (1902); *Kennedy*, Fl. Willoughby in Rho. 6: 111 (1904); *Jelliffe*, Gibson's Nat. Orch. 39, t. 17, f. 2 & t. 18 (1905), not *H. dilatata* Wats., Bot. King 340 *H. dilatata*

H. dilatata (1871) (= *H. leucostachys*), not *Mecosa dilatata* Bl. (July, 1825) (= *Platanthera Blumii* Lindl.).

Orchis dilatata *Pursh*, Fl. 2: 588 (1814); *Nutt.*, Gen. 2: 189 (1818); *Eaton*, Man. ed. 4, 376 (1824); *Big.*, Fl. Bost. ed. 2, 319 (1824), ed. 3, 342 (1840) in part; *Wood*, Class-book, ed. 41, 583 (1856); *Provanch.*, Fl. Canad. 2: 566 (1862).—**O. acuta** *Banks*, in herb. according to Pursh, *loc. cit.* (*verified October, 1905*).—**O. agastachys** *Fischer*, in MS.—?**O. convallariæfolia** *Fischer*, in MS.—**O. hyperborea** VAR. **dilatata** *Oakes*, in Thompson's Vt. 199 (1853).

Platanthera cylindrica *de la Pylaie*, in Mém. Soc. Linn. Par. 4: 503 (1826?).

Habenaria borealis VAR. **albiflora** *Cham.*, in Linnæa 3: 28 (1828).

Platanthera graminea *Lindl.*, Gen. & Sp. Orch. 289 (1835); *Hook.*, Fl. Bor. Am. 2: 199 (1839), not *H. graminea* Spreng., Syst. Veg. 3: 690 (1826), nor Lindl., *loc. cit.* 292, nor Macoun, Cat. 4: 15 (= *H. sparsiflora*).—**P. dilatata** *Lindl.*, ex Beck Bot. ed. 1, 347 (1833), ed. 2, 347 (1856) in part; *Lindl.*, Gen. & Sp. Orch. 287 (1835) in part; *Hook.*, Fl. Bor. Am. 2: 198 (1839), with var. *angustifolia*; *Eaton & Wr.*, N. A. Bot. ed. 3, 361 (1840); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Torr.*, Fl. N. Y. 2: 276 (1843); *Gray*, Man. ed. 1, 471 (1848), ed. 2, 445 (1856), ed. 3, 445 (1859); *Torr.*, in Emory Mex. Bound. Surv. 213 (1859); *Wood*, Class-book 684 (1861); *Paine*, Pl. Oneida Co. 84 (1865); Portl. Cat. 7 (1868); *Correvon*, Orch. Rust. 169 (1893); *Kurtz*, in Engl. Bot. Jahrb. 19: 408 (1895); *Andrews*, in Rho. 4: 79 (1902).—**P. Lindleyi** *Steud.*, Nomencl. ed. 2, 2: 351 (1841). —**P. hyperborea** VAR. **graminea** *Reichb. f.*, Orch. Eur. 126, t. 81 (483), f. II, 4–8 (1851); *Reichb. f.*, in Walp. Ann. 3: 582 (1852). —**P. borealis** *Reichb. f.*, Orch. Eur. 125, t. 79 (481), f. I, 1 & 2

(1851).—**P. convallariæfolia** *Reichb. f.*, Orch. Eur. 127 (in part?), t. 79 (481), f. II, 3 & 4 (1851).—**P. dilatata α albiflora** *Ledeb.*, Fl. Ross. 4: 71 (1853).—**P. gracilis** *Rydb.*, in Bull. Torr. Bot. Cl. 24: 189 (1897), not *Lindl.* *H. dilatata*

Habenaria dilatatiformis *Rydb.*, in Bull. Torr. Bot. Cl. 24: 189 (1897), excl. syn.—**H. gracilis** *Rydb.*, in Bull. Torr. Bot. Cl. 24: 189 (1897), not *Wats.*—**H. Cooperi** *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899), not *Wats.*—**H. pedicellata** *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899), not *Wats.*

Limnorchis dilatatiformis *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 105 (1900); *Farr*, in Contr. Bot. Lab. Univ. Pa. 3: 28 (1907). —**L. dilatata** *Rydb.*, in Britton's Man. 294 (1901), in Bull. Torr. Bot. Cl. 28: 608, 622 (1901); *House*, in Torreya 3: 51 (1903); *Small*, in Porter's Fl. Pa. 93 (1903); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 210 (1906).—**L. dilatata linearifolia** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 623 (1901); *House*, in Torreya 3: 51 (1903), Bull. Torr. Bot. Cl. 32: 377 (1905).—**L. fragrans** *Rydb.*, in Britton's Man. 294 (1901), in Bull. Torr. Bot. Cl. 28: 623 (1901); *Andrews*, in Rho. 4: 80 (1902).—**L. borealis** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 621 (1901).—**L. foliosa** *Rydb.*, *loc. cit.* 622 (1901).—**L. leptoceratitis** *Rydb.*, in Bull. N. Y. Bot. Gard. 2: 162 (1901), Bull. Torr. Bot. Cl. 28: 624 (1901) in part, according to specimen cited.—**L. graminifolia** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 627 (1901) according to specimens cited.—**L. gracilis** *Rydb.*, *loc. cit.* 627 in part, according to specimens cited.—**L. convallariæfolia** *Rydb.*, *loc. cit.* 628 as to Unalaska specimens.

Habenaria fragrans *Niles*, Bog-trotting for Orchids 258 (1904).—**H. media** *Niles*, Bog-trotting for Orchids 252 (1904).

"17. O. labello lineari integerrimo obtusiusculo, basi subrotundato-dilatato, cornu longitudine labelli: germine breviore, bracteis longitudine florum, caule folioso.

H. dilatata "O. acuta. *Herb. Banks. mss.*

"In Labrador. *Colmaster* ♃. *v. s. in Herb. Dickson.*" Pursh, *loc. cit.*

H. dilatata VAR. **media** (*Rydb.*) *Ames*, in Rho. 10: 70 (1908), in Gray's Man. ed. 7, 808 (1908).

Limnorchis media *Rydb.*, in Britton's Man. 294 (1901) in part, in Bull. Torr. Bot. Cl. 28: 618 (1901) in part, according to specimens in Columbia Herbarium; *Andrews*, in Rho. 4: 80 (1902); *Haberer*, in Rho. 7: 106 (1905); *House*, in Bull. Torr. Bot. Cl. 32: 377 (1905).

This variety is distinguished from the species by its greenish-yellow flowers. From *H. hyperborea*, with which it is likely to be confused, it is distinguished by the rhombic base of the labellum. It is found together with the species. No attempt has been made to distinguish between the white and greenish flowered forms in the following citations of specimens.

Habenaria dilatata is an extremely variable species both in its vegetative and floral parts, consequently agreement as to what forms it should include is hardly to be expected. In my studies I have examined material both dry and fresh, both wild and cultivated, and I have found no satisfactory characters by which to separate from one another and from *H. dilatata* the segregates which have been recognized by botanists. The original or type specimen of *H. dilatata* preserved in the British Museum of Natural History, although badly damaged, is quite serviceable and exhibits a boreal state which differs from the luxuriant specimens common in more southern localities in nothing but its vegetative parts. The habit of the type is well represented by specimens collected in the Province of Quebec in alpine bogs on Mt. Albert by Collins and Fernald. Such forms

H. *dilatata*

as are represented by *Habenaria fragrans*, *H. borealis* var. *albiflora*, and *Platanthera graminea* are merely vegetative variants and are scarcely worthy of even varietal distinction. It is a question whether or not plants referable to these maintain during several generations the characteristics which have been regarded specifically valid. It is by no means improbable that the boreal form if transplanted to less rigorous conditions would assume a more luxuriant and taller habit.

Dr. Rydberg has reinstated *Habenaria borealis* var. *albiflora* Cham. in his genus Limnorchis, and asserts that it differs from *Habenaria dilatata* in its shorter, more clavate spurs, dull or greenish white flowers, and in the usually smaller size. According to his views *H. borealis* represents *H. dilatata* in the Rocky Mountain region. In addition to specimens collected in the Northwest by Chamisso, distributed as *H. borealis* var. *viridiflora* and *H. borealis* var. *albiflora*, I have examined both dried and fresh material from British Columbia which is well within the range to which Dr. Rydberg assigns *H. borealis*. In 1904 I received material from Mr. E. Wilson, gathered in British Columbia, which grew very well in the wild garden connected with my laboratory. Near at hand, in the same garden, were numerous specimens specially collected in Vermont and Maine for comparison with the Northwestern specimens. A careful study of the different sets of plants showed no appreciable difference in the color of the flowers, length of spurs, denseness of the inflorescence, characters of the foliage or outline of the lips. Every peculiarity exhibited by the plants from the Northwest was found in plants from Vermont and Maine.

There were two colonies of the British Columbian plants, one in a shaded locality, the other in an open grassy place, where during the morning the plants received the full brightness of the

H. dilatata sun. A similar distribution of the Eastern specimens was arranged. The results of this experiment tend to show that Dr. Rydberg's conclusions are by no means convincing, and that the differences on which he relies in making distinctions between the Eastern and Northwestern plants are very often individual peculiarities of trifling importance. The variation in the conformation of the lips in all of the colonies was remarkable and showed every gradation from rhombic-lanceolate to linear. The spurs, too, both in length and stoutness, exhibited no constancy even on the same plant.

The position of the variety *leucostachys* is not so clear as that of *H. borealis.* It is evident, however, that the length of the spur is the only conspicuous character which may be relied on for its identification. Among specimens from Little Metis, Province of Quebec, collected in August, 1902, by E. C. Jeffrey, there are flowers, with elongated slender spurs, which resemble so closely specimens from California, collected by E. B. Copeland, that it is impossible to differentiate between them without reference to the labels. The Californian specimens would without hesitancy be referred to *H. leucostachys*, while the Canadian plants would be referred to *H. dilatata* because of their Eastern origin. On the other hand between these long-spurred specimens and the typical form of *H. dilatata* there are transitions which tend to show that specific distinction is out of the question. Perhaps *H. leucostachys* should, after all, be referred to the synonymy of *H. dilatata.* In 1899 I collected near Mt. Shasta, California, a series of specimens which represents both long and short-spurred forms. The short-spurred specimens if found in the eastern United States would be referred without hesitation to *H. dilatata.*

Limnorchis fragrans Rydberg is, as its name implies, partly

H. dilatata

distinguished by fragrant flowers. Fragrance is not uncommon in *Habenaria dilatata*. It has been detected frequently enough to be regarded an attribute of the species. I have detected it in all the material I have collected, and in the plants from Mt. Albert, Quebec, which resemble the type, fragrance was noted by Collins and Fernald.

Platanthera graminea Lindl., which Rydberg reinstated in his genus Limnorchis, under the specific name *graminifolia*, was described originally by Lindley from Western specimens collected by Menzies. I examined Lindley's type with extreme care in 1905, and compared it with a rich series of *dilatata* forms from my herbarium. The results of my examination absolutely convince me that *P. graminea* is nothing more than a slender, narrow-leaved condition of *Habenaria dilatata*.

In *Orchidacearum Genera et Species* Dr. Kränzlin reduces *Habenaria dilatata* to a variety of *H. hyperborea*. This treatment of the subject, while it may appear very radical to American botanists, is more comprehensible than the course which Rydberg has pursued in his monograph of the genus Limnorchis. These two authors stand at the extremes in their views of the systematic arrangement of the Dolichostachyæ. Kränzlin reduces species because he finds it a fruitless task to try to differentiate them; Rydberg multiplies species, using characters which Kränzlin finds inconstant. In my opinion both of these writers have gone too far, yet, notwithstanding an extended study of numerous specimens, many of them constituting the types of the species examined, I feel that finality is hardly to be expected where the Dolichostachyæ group is concerned until material from numerous localities has been observed under cultivation, or at least while fresh and equally developed. Stoutness and thinness of spur, comparative length of spurs and lips, *H. dilatata* and similar distinctions, are too much influenced by the age of the flowers examined to be seriously considered in the differentiation of plants supposed to be distinct.

When one studies the work of European botanists devoted to our orchid flora, the fact must not be overlooked that they often had to draw conclusions from inadequate material and were unable to ascertain the range of variation or the extent and effects of distribution.

GREENLAND

Disco, Disco Fjord, 69° 25′ N., August 24, 1902, *Aug. Krogh* (6).—Rich damp soil, brook banks, flowers pale greenish yellow, sweet-scented, Godhavn, Disco Isl., August 4, 1877–8, *L. Krumlein*, Howgate Expedition (3).—Ilna, 59° 55′ N., 1889, *Dna E. Lundholm* (6).

SUBARCTIC AMERICA

1861–2, *J. S. Onion* (2).

NEWFOUNDLAND

In Terra Nova, *De la Pylaie* (2) (type of *Platanthera cylindrica*).—Low grounds, July, 1885, *R. Bell* (6).—Salmonier, August, 1885, *R. Thaxter* (3).—Banks of Exploits River, near the mouth of Badger Brook, August 12, 1894, *B. L. Robinson & H. Schrenk* (no. 110) (2, 3, 4, 6, 7).—Bogs, Birsby Cover, July 22, 1881, *Rev. A. C. Waghorne* (4).—Damp meadow near Topsail, Conception Bay, August 12, 1901, *C. D. Howe & W. F. Lang* (no. 1329) (3).—Sphagnous swamp, Bell Isl., August 12–19, 1901, *Lang* (no. 1288) (3).—Bogs, Lark Harbor, Bay of Islands, July 27, 1895, *Waghorne* (no. 15) (3, 4).—Wet field, Irishtown, Bay of Islands, July 28, 1887, *Waghorne* (no. 2) (3, 4).—Damp soil in open woods, Bay of Islands, August 9 and 10, 1901, *Howe & Lang* (no. 1121) (3); damp soil, *Howe & Lang* (no. 1138) (3).

LABRADOR

Okkak, *Fratres Morav. legerunt. Webb ded.* February 5, 1854 (3).—Davis, Inlet, August 1, 1892, *J. D. Sornborger* (no. 76) (3).—Houlton Harbor, August 19, 1891, Bowdoin Coll. Exp. (no. 264) (3).—Makkoirk, August, 1896, *A. Stecker* (no. 77) (2, 3, 4, 5).—Cartridge Bight, August 28, 1891, *Waghorne* (6).

UNGAVA

Southern Ungava, July, 1895, *A. P. Low* (6).—Between Sandy Lake and Lake Michikaman, July 19, 1894, *Low* (6).—North of Cape Jones, Hudson Bay, July 6, 1899, *Low* (6).

NOVA SCOTIA, Inverness County

By spring, Big Intervale, Cape Breton Isl., July 16, 1898, *J. Macoun* (6).

Cape Breton Co.: Cold bogs, Louisburg, July 17, 1883, *Macoun* (6).

Guysboro Co.: Boylston, July, 1890, *Dr. C. A. Hamilton*.

NEW BRUNSWICK, Victoria County

Boggy places, Little Tobique River, July, 1884, *Geo. U. Hay* (6).

Kent Co.: July 27, 1870, *J. Fowler* (3, 16).

PRINCE EDWARD ISLAND

In swamps, Tignish, July 26, 1888, *J. Macoun* (6); July 27, 1888, *Macoun* (2).—Bogs, North Pond, August 15, 1888, *Macoun* (6).

QUEBEC

Wet, sandy places, Lake Mistassini, July 13, 1885, *J. Macoun* (6).—Swamps, mouth of Riviere du Loup, 1860, *Wm. M. Canby* (16).—Mingan Isl., August 11, 1887, *Wm. Palmer* (2).—Cold bogs, Riviere de Brig, Anticosti Isl., August 10, 1883, *Macoun* (6).

Gaspé Co.: Peat bogs and mountain woods, Mt. Albert, August 25, 1882, *J. Macoun* (6); fragrant, everywhere in alpine bogs, alt. 900 and 1050 m., Mt. Albert, August 8–15, 1905, *J. F. Collins & M. L. Fernald* (1).—Shores of Grand River, June 20–July 10, 1903, *Geo. H. Richards* (3).

Rimouski Co.: Swamp, Little Metis, August, 1902, *E. C. Jeffrey* (1).

Bonaventure Co.: Goose Lake, New Richmond, July 16, 1905, *O. Ames*.—On exposed silurian rock, shore of Great Cascapedia River, July 14, 1905, *Ames* (1).

ONTARIO, Nipissing District

In a peat bog, Catfish Lake, Algonquin Park, July 23, 1900, *J. Macoun* (6).

Thunder Bay Dist.: *In lit. boreal*, Lake Superior, *Macoun* (4).—Michipicoten Isl., July 24, 1869, *Macoun* (16).—Pic River, *Loring* (3).

Frontenac Co.: Soughboro Lake, 1886, *W. Nicol* (2).

Hastings Co.: In swamps and marshy woods, July 10, 1867, *Macoun* (6).

Victoria Co.: Boggy places, Ops, August 1, 1893, *W. Scott* (6).

Northumberland Co.: In swamps and bogs, July 27, 1874, *Macoun* (6).

H. dilatata York Co.: Newmarket, June 21 and October 13, 1897 (Biltmore no. 2520 a) (5).

Huron Co.: Wingham, July 6, 1895, *J. A. Morton* (no. 3026) (5, 14); bogs, July 20, 1890, *Morton* (6).

Wellington Co.: Guelph, June 28, 1904, *A. B. Klugh* (1); August, 1903, *Klugh* (1).

Lambton Co.: Near Sarnia, June 19, 1893, *C. K. Dodge* (6).

KEEWATIN

Mouth of Albany River, James Bay, July 10, 1901, *D. B. Dowling* (6).—Albany, July 25, 1904, *W. Spreadborough* (6).

YUKON

White Horse, August 30, 1902, *J. Macoun* (1).

SASKATCHEWAN

Marshes and swamps, Red Deer River, lat. 53°, August 10, 1881, *J. Macoun* (6).—In the Muskeg, north of Prince Albert, July 3, 1896, *Macoun* (6).

ASSINIBOIA

Thickets by a spring, Cypress Hills, June 27, 1894, *J. Macoun* (6).

ALBERTA

Shore of Waterton Lake, July 28, 1895, *J. Macoun* (6).—In boggy woods, South Kootenay Pass, August 8, 1881, *Dawson* (6).—Red Deer, July 23, 1904, *Willing & Fletcher* (1).—Mt. Molar Creek, Pipestone Creek, July 8, 1904, *Macoun* (no. 65,643) (1); Pipestone Creek, July 10, 1904, *Macoun* (no. 65,644) (1).—Between Field and Emerald Lake, August 20, 1904, *Macoun* (no. 65,642) (1).

BRITISH COLUMBIA

Northern British Columbia, 1865–6, *J. T. Rothrock* (no. 66) (2).—In swamps and bogs, Tanyabunkat Lake, July 9, 1876, *Dawson* (6).—Maclennan River, a branch of Fraser River, July 31, 1898, *W. Spreadborough* (6).

Cassiar Dist.: Lake Lindeman, near boundary of Yukon Territory, July 8, 1902, *J. Macoun* (1).—Boggy places, Swamp River, July 10, 1879, *Dawson* (3).

Cariboo Dist.: Moose Lake, head-waters of Fraser River, July 19, 1898, *Spreadborough* (6).

New Westminster Co.: Tennant Isl., Queen Charlotte Isls., July, 1897, *Dr. C. F. Newcombe* (6).—Kaisan, west coast of Queen Charlotte Isls., July 13, 1894, *Newcombe* (6).

Comox Co.: Bogs near Union Mines, Comox (Vancouver Isl.), June 26, 1893, *Macoun* (2, 4, 6).

Nanaimo Co.: Damp woods, Mt. Benson, June 6, 1887, *Macoun* (6).—Westwood spring, June 6, 1887, *Macoun* (2).

Yale Dist.: Chilliwack Lake, alt. 4000 ft., July 12, 1901, *J. M. Macoun* (no. 65,646) (1); July 24, 1901, *Macoun* (1).—Armstrong, July 11, 15 and 17, 1904, *E. Wilson* (1).—Boggy places, Craigellachie, July 18, 1889, *J. Macoun* (6).—Mountains south of Tulameen River, July, 28, 1888, *Dr. C. M. Dawson* (6).

Kootenay Dist.: Springy places, Revelstoke, 1890, *Macoun* (6).—Springy places, Hot Springs, Kootenay Lake, Ainsworth, 2800 ft., July 7, 1890, *Macoun* (6).—Glacier, August, 1903, *Chas. Schaffer* (1).

ALASKA

Chamisso (*H. borealis* var. *albiflora*) (3); 1880, *Fischer* (4, 21); 1871–2 *M. W. Harrington* (3).—Karluk, June 30, 1903, *Cloudsley Rutter* (9); July 25, 1903 (9).—Popoff Isl., July 8, 1899, *Trelease & Saunders* (no. 3284) (4).—Unalaska, *Harrington*, Dall's Exp. 1871–2 (4).—Along streams, Iliuliuk, Unalaska, September 24, 1871, *Harrington* (3).— July 8, 1899, *Trelease & Saunders* (no. 3285) (4).—Kukuk Bay, Alaska Peninsula, July 5, 1899, *Trelease & Saunders* (no. 3286) (4).—Kadiak, Unalaska, &c., Cruise "Albatross," 1888 (9); July 1, 3 and 26, 1899, *Trelease & Saunders* (nos. 3281, 3282, 3291, 3292) (4).—Disenchantment Bay, June 19, 1899, *Trelease & Saunders* (no. 3280) (4).—La Perouse Glacier, June 18, 1899, *Trelease & Saunders* (no. 3287) (4).—Shumagins, Nagai Isl., July 27, 1872, *Harrington* (3).—Banks, Shumagins, Popoff Isl., June 28, 1872, *Harrington* (3).—Kyska Harbor, July 19, 1873, *W. H. Dall* (3).—Bering Isl., 1882, *L. Stejneger* (no. 51) (3); September 1, 1891, *J. M. Macoun* (6, 7).—Amchitka Isl., *Dall* (3).—Unalaska, July 25, 1891, *Macoun* (no. 142?) (3).—Douglas Isl., July 25, 1891, *Grace E. Cooley* (3).—Along the Ankow River, near Ocean Cape, July 1, 1891, *F. Funston* (no. 52) (3, 4, 6).

MAINE, Aroostook County

Valley of the Aroostook, July 12, 1902, *Williams, Collins & Fernald* (1).—Wet roadside in spring water, Bicker Brook, near Fort Kent, July 16, 1904, *A. A. Eaton* (nos. 151, 152) (1); sphagnum bog, 3 miles west of Fort Kent, July 19, 1904, *Eaton* (no. 178) (1); sphagnum bog, Fort Kent, July 18, 1904, *Eaton* (no. 168) (1); bank of St. John at Fort Kent, July19, *H. dilatata* 1904, *Eaton* (no. 178) (1).—Cool shore of river at Horseback, St. Francis, July 20, 1904, *Eaton* (no. 195) (1).—Arbor vitæ swamp, Mapleton, July 11, 1902, *Williams, Collins & Fernald* (1, 3).

Piscataquis Co.: Lower beaver bog, south fork of Red River, T. 15, R. 9, July 15, 1905, *F. T. Hubbard* (1).—Sphagnum bog, upper end of Mud Pond, July 10, 1905, *Hubbard* (1).—In moss, open parts of Caribou bog, Crystal, July 30, 1906, *O. W. Knight* (1).—*In locis paludosis*, Mt. Katahdin, June 21, 1859, *J. W. Chickering, Jr.* (16).—Shelves at 4000–4500 ft., Westwall, North Basin, Mt. Katahdin, July 13, 1900, *M. L. Fernald* (3).—Howard, *Susan M. Hallowell* (2).—Sphagnous swamp, Sangerville, August 9, 1895, *Fernald* (no. 143) (2, 4).

Franklin Co.: Cold swamp, Chesterville, July 18, 1902, *C. H. Knowlton* (no. 689) (1).—Swampy field, Industry, July 9, 1896, *Knowlton* (no. 689) (1).—Open swamp, Chesterville, June 30, 1902, *L. O. Eaton* (1).

Oxford Co.: Upton, July 28, 1888, *J. C. Parlin* (3).

Hancock Co.: Swamp between Triad and Pemetic, Mt. Desert, July 17, 1888, *John H. Redfield* (4).

Cumberland Co.: Cold bogs, Brunswick, July 29, 1894, *Charles A. Davis* (2); Brunswick, July, 1889, *Aaron Young, Jr.* (3); June 25, 1886, *E. C. Smith* (4).

York Co.: Wet woods with *H. fimbriata*, North Parsonsfield, June, 1902, *R. G. Leavitt* (1).

NEW HAMPSHIRE

Base of White Mts., July, 1885, *Wm. Boott* (3).—White Mts., *Wm. Oakes* (2, 3); July 14, 1862, *Blake* (4); 1874, *Dr. Chickering* (2); Swamps, July 15, 1862, *J. W. Chickering, Jr.* (16); July 14, 1877, *Chickering, Jr.* (8); *Mrs. Thompson* (10); *Susan M. Hallowell* (2); August 14, 1881, *Warren H. Manning* (6).

Coos Co.: Crawford's, July 7, 1878, *Faxon* (3).—Tuckerman's Ravine, July 25, 1889, *Clara E. Cummings* (4).—Mt. Washington, June 26–August 31, 1876, *Wm. F. Flint & J. H. Huntington* (4); June, 1885, *Miss H. L. Brown* (1).—Oakes Gulf, Mt. Washington, July 8, 1895, *W. F. Williams* (2).

Carroll Co.: Cold bogs on mountain sides, June 10, 1874, *Morong* (6).

VERMONT

Green Mts., 1877, *Ezra Brainerd* (8).—Jay Peak, July 6, 1903, *E. J. Winslow* (1); July 6, 1905, *Winslow* (1).

Orleans Co.: Willoughby, July 11, 1903, *Winslow* (1).—Willoughby Bog, July 27, 1904, *A. A. Eaton* (no. 249) (1).—Willoughby Lake, July 13, 1887, *E. Faxon* (16).—Willoughby Lake House, July 13, 1887, *Faxon* (2, 3).—Willoughby, July 26, 1892, *H. H. Rusby* (10).—Tinkham's Bog, Brownington, July 26, 1904, *Eaton* (nos. 230 and 233) (1); July 13, 1903, *E. J. Winslow* (1); July 15, 1905, *Winslow* (1).

Lamoille Co.: Mt. Mansfield, June 25, 1900, *A. H. Howell* (2); near summit Mt. Mansfield, July 3, 1896, *L. R. Jones* (5).—Stowe, June, 1899, *Howell* (2); July, 1884, *C. W. Swan* (6).

Caledonia Co.: Stoddard's swamp, Peacham, July 13, 1892, *Dr. F. Blanchard* (4); July 13, 1892, *Mrs. A. E. Stevens* (2).

Addison Co.: Bristol Pond bog, June 15, 1877, *C. G. Pringle* (7).—Middlebury, July 1, 1880, *T. E. Boyce* (1).—Lincoln, July 2, 1877, *Ezra Brainerd* (10).

Rutland Co.: Cold, springy places, Killington Mt., Sherburne, July 4, 1892, *W. W. Eggleston* (2).

Windsor Co.: Hay meadow on the eastern slope of a hill, June, 1899, *E. M. Kittridge* (2).

Windham Co.: Grout Pond, Stratton, July 4, 1895, *A. J. Grout* (2); June 28, 1902, *W. H. Blanchard* (7).—Swamp, West Westminster, June 24, 1902, *Blanchard* (3); July 5, 1902. *Blanchard* (7).

Bennington Co.: Manchester, July 18, 1898, *M. A. Day* (no. 313) (3).

MASSACHUSETTS, Middlesex County

Peaty meadow, left side of road to S. Reading, Stoneham, *Wm. Boott* (3).

Franklin Co.: Cold spring swamp, Sunderland, May 29, 1905, *R. G. Leavitt*, *A. V. Osman & R. A. Ware* (1).

CONNECTICUT, Hartford County

East Hartford, *Miss Elmore* (2).

NEW YORK

Flowers green, western New York, *A. Gray* (?) (3).

Franklin Co.: Axton swamp, July 9, 1899, *Rowlee, Wiegand & Hastings* (3.)

Herkimer Co.: Mud Lake, Warren, July, 1873, *Edwin Hunt* (1).—Hidden Lake, Litchfield, June 27, 1901, *J. V. Haberer* (1); July 12, 1903, *Haberer* (1).

Washington Co.: East Greenwich, 1867, *Dr. Asa Fitch* (10).—Swampy woods east of Tripoli, May–June, 1893, *S. H. Burnham* (1).

H. dilatata Oswego Co.: Bogs, tamarack swamp, North Hannibal, July 9, 1882, *O. E. Pearce* (2); June 27 and 28, 1885, *Pearce* (2).

Onondaga Co.: Near Syracuse, *T. Marshall Fry* (1).

Oneida Co.: Tamarack swamp, Bridgewater, *Gray* (3).

Wayne Co.: Galen, *H. P. Sartwell* (3, 4).

Madison Co.: Bog beside road, 3 miles south of Chittenango, alt. 700 ft., August 9, 1903, *H. D. House* (18).—Near South Bay, August, 1903, *House* (18).

Genesee Co.: Bergen, *G. W. Clinton* (16).

Yates Co.: Penn Yan, *Sartwell* (9).

Tompkins Co.: Mud Creek, Dryden, July 27, 1893 (4).

NEW JERSEY

In cold bog, July, 1880, *Rev. Chas. Hall* (no. 486) (2).

MICHIGAN, Keweenaw County

Cold marshes, July, 1886, *O. A. Farwell* (no. 372) (3).—Clifton, June 15, 1886, *Farwell* (nos. 371, 372½) (11).—Keweenaw Point, July 14, 1884, *F. E. & F. J. Wood* (2); 1863, *Dr. Robbins* (no. 151) (4).

Marquette Co.: Turin, July 13, 1901, *Bronson Barlow* (2).—Michigamme, July 17, 1887, *Wm. Trelease* (4).—Republic, July 17, 1887, *Trelease* (4).

Emmet Co.: Bogs, Paige Brook, August 28, 1897, *C. W. Fallass* (5).

Oakland Co.: Clarkston, July, 1888, *G. H. Hicks* (2, 3).

Ingham Co.: Agricultural College, June 30, 1895, *W. E. Mulliken* (5).

Washtenaw Co.: Ann Arbor, June 21, 1862, *N. H. Winchell* (8).—Swamps, Pittsfield, May 25, 1860, *D. V. Deane* (4).

St. Joseph Co.: Constantine, June 6, 1890, *C. F. Wheeler* (2).

WISCONSIN, Door County

Bogs, Lily Lake, July 16, 1890, *J. H. Schuette* (1).

Sheboygan Co.: Peat bogs, Elkhart Lake, June 29, 1879, *J. H. Schuette* (1); swamps, August 6, 1892, *Schuette*.

MINNESOTA

Rat Lake, July, 1891, *F. F. Wood* (2).

Chisago Co.: Lindstrom, August, 1892, *B. C. Taylor* (5).

Beltrami Co.: Sphagnum swamps, Itasca Lake, July 9, 1891, *J. H. Sandberg* (no. 1186) (2); bogs, June 24, 1891, *Sandberg* (no. 1020) (2); July, 1891, *Geo. B. Aiton* (1).

Pine Co.: Partridge River, July, 1891, *Sandberg* (no. 518) (2).

Hennepin Co.: Shady woods on the reservation, Fort Snelling, June 9, 1888, *Dr. W. H. Forwood* (2).—Peat bog near Minneapolis, August, 1890, *Geo. B. Aiton* (2, 5).—Minneapolis, 1861, *T. J. Hale* (3).

SOUTH DAKOTA, Meade County

Gravelly soil, Deadman's Creek, near Fort Meade, August 23, 1887, *W. H. Forwood* (no. 339) (2).

MONTANA

Flathead Creek, August 17, 1899, *J. W. Blankinship* (1); divide between Flathead and Brackett Creeks, August 18, 1899, *Blankinship* (1).—Belt Creek, August, 1883, *F. L. Scribner* (16).—Muddy borders, Ray Creek, alt. 4500 ft., July 9, 1883, *Scribner* (16).—MacDonald's Pass, Rocky Mts., August 9, 1883, *Wm. M. Canby* (16).—Near Hodosis? Coal Mine, August 21, 1887, *F. H. Knowlton* (2).—Red Lodge, July 29, 1893, *J. N. Rose* (no. 115) (2).—By streams, Belt Mts., near White's Gulch, August 25, 1882, *Canby* (16).

Flathead Co.: Columbia Falls, July 5, 1894 (no. 812) (2) and August 20, 1894 (no. 519), *R. S. Williams* (2, 5).

Meagher Co.: North fork Smith River, alt. 6000 ft., July 16, 1889, *Scribner* (16).

Gallatin Co.: Spanish Basin, July 11, 1896, alt. 6000 ft., *J. H. Flodman* (no. 361) (2); July 10, 1896, *Flodman* (no. 360) (2); July 1, 1897, alt. 6500 ft., *P. A. Rydberg & E. A. Bessey* (no. 3891) (2, 3, 6).—Fort Ellis to Yellowstone River, July 15–20, 1871, *Robert Adams* (2); July, 1871, *Hayden* (16).—Shale Mt., east of Lone Mt., July 8, 1898, *Blankinship* (1).—Boggy places, lower basin of the Gallatin, July 6, 1898, *Blankinship* (1).

Madison Co.: Old Hollowtop, near Pony, July 7, 1897, alt. 9000 ft., *Rydberg & Bessey* (no. 3903) (3).

WYOMING

1872, Hayden's Exp. (2).—La Plata Mines, August 23, 1898, *Elias Nelson* (no. 5095) (3, 4).

Uinta Co.: Lone Star Geyser Basin, Yellowstone Park, August 7, 1897, alt. 7500 ft., *P. A. Rydberg & E. A. Bessey* (no. 3902) (6), (no. 3894a) (2), (no. 3898) (6).—Swan Lake Valley, Yellowstone Park, July 6, 1880, *F. H. Knowlton* (2).—Boggy meadows, Apollinaris Spring, July 6, 1899, *H. dilatata*

J. W. Blankinship (1).—Along shady brooks, Continental Divide, July 11, 1899, *Blankinship* (1).

Albany Co.: Bear Creek, about four miles from Laramie Peak, August 22, 1899, *Chas. Schuchert* (2).—Laramie Peak, July 22, 1898, *Aven Nelson* (no. 1706?) (4).—In bogs near alpine lakes, Telephone Mines, July 30, 1900, *Nelson* (no. 7845) (1, 3, 4, 7).

Carbon Co.: Ferris Mts., July 24, 1898, *Elias Nelson* (no. 5090) (5).

COLORADO

Meadows near Berthoud Pass, July 23, 1881, *Geo. Engelmann* (4).—Wet, grassy slopes, Berthoud Pass, 1868, Powell's Col. Expl. Exp. (no. 541) (16).—Rocky Mts., 1870, *E. L. Greene* (9).—Wet Mt. Valley, July 24, 1892, *John H. Redfield* (no. 356) (4).—Gore Pass, July 29, 1891, *C. S. Crandall* (2).

Routt Co.: Watton Creek, July, 1892, *Alice Eastwood*, in part (9).

Larimer Co.: Bridger's Pass, Medicine Bow Mts., 1854, Lieut. Bryan Exp., *Henry Engelmann* (3).—In wet bog, Chambers Lake, alt. 9500 ft., July 4, 1894, *Crandall* (no. 475) (2); July 3, 1894, *C. F. Baker* (1); July 13, 1896, *Baker* (4, 14).

Clear Creek Co.: Subalpine swamps, head-waters of Clear Creek, 1861, *C. C. Parry* (no. 357) (3, 4).

Garfield Co.: Golden City, 1870, *Greene* (no. 555) (3).

Gilpin Co.: Central City, 1869, *Dr. J. T. Scovell* (8).

Hinsdale Co.: Near Lake City, 1879, *F. N. Pease* (no. 155) (3).

UTAH

1891, *Mrs. W. C. Dodd* (9).—High Wahsatch, 1877, *J. D. Hooker & A. Gray* (3).—Clayton Peak, Wahsatch Mts., alt. 9000 ft., August 12–26, 1903, *S. G. Stokes* (4).—Echo Cañon, July, 1869, alt. 6500 ft., *S. Watson* (no. 1152) (3).

Weber Co.: Mountains near Ogden, 1872, Hayden's Exp. (2).

Salt Lake Co.: Alta, August, 1880, *M. E. Jones* (2).

Utah Co.: American Fork Cañon, alt. 7500 ft., July 31, 1880, *Jones* (2); alt. 10,000 ft., Silver Lake, American Fork Cañon, July 23, 1895, *Jones* (2, 4).

NEW MEXICO

Pecos River, August 6, 1898, *G. E. Coghill* (no. 147) (4).

IDAHO *H. dilatata*

Santianne Creek Bottoms, alt. 950 m., June 24, 1895, *John B. Leiberg* (no. 1035) (2).—MacAbee's Ranch, Priest River Valley, alt. 600 m., July 23, 1900, *D. T. MacDougal* (no. 7) (6).

Shoshone Co.: Region of the Cœur d'Alene Mts., alt. 950 m., June 24, 1895 (no. 1035) (2).

Nez Percés Co.: About Forest, July 16, 1896, alt. 3500 ft., *A. A. & E. G. Heller* (4).

Boise Co.: Near Sawtooth, July 12–18, 1896, *B. W. Evermann* (no. 581) (2); July 22–24, 1896, *Evermann* (no. 636) (2).

WASHINGTON

1883, *T. S. Brandegee* (no. 1093) (16).—Cascade Mts., 1882, *Brandegee* (no. 480) (16).—Yakima Region, 1882, *Brandegee* (no. 482) (4).

King Co.: Seattle, June, 1892, *Emma A. Shumway* (4).

Spokane Co.: Cheney, *Mrs. Susan Tucker* (no. 100) (3).—Mt. Carleton, July 17, 1902, *Frank O. Kreager* (no. 195) (2).—"Fls. yellowish green," meadows, June 27, 1884, *W. N. Suksdorf* (no. 452) (3).

Chehalis Co.: Along tide-water, Chehalis River, June 12, 1897, *Frank H. Lamb* (no. 1199a) (4, 5, 9).

Kittitas Co.: Mt. Stuart, July, 1898, *A. D. E. Elmer* (no. 1213) (2).

Yakima Co.: Near snow-line, bog, Mt. Adams, August 10, 1882, *L. F. Henderson* (10).—Wet meadows, 6000–7000 ft. alt., Mt. Paddo, September 28, 1893, *Suksdorf* (no. 2298) (2, 3, 4).

OREGON, Union County

1880, *W. C. Cusick* (1, 3).

Wallowa Co.: Banks of Wallowa River, June, August, 1886, *W. C. Cusick* (no. 1441) (3, 16).

CALIFORNIA

1853, *Gibbons* (3).—Flowers small and green, Mono Lake, 1860–2, *Wm. H. Brewer* (no. 1835) (3).

Mendocino Co.: Pt. Arenas, July 17, 1868, *Dr. A. Kellogg & W. G. W. Harford* (no. 958) (3, 4).

Habenaria dilatata var. **leucostachys** comb. nov. *H. dilatata* var. *leucostachys*

Platanthera leucostachys *Lindl.*, Gen. & Sp. Orch. 288 (1835); *Hook.*, Fl. Bor. Am. 2: 198 (1839); *Steud.*, Nomencl.

H. dilatata var. *leucostachys*

ed. 2, 2: 851 (1841); *Newberry*, in Pac. R. R. Rep. 6: 92 (1857); *Cooper*, in Pac. R. R. Rep. 12: part 2, 69 (1860).

Habenaria leucostachys *Wats.*, Bot. Cal. 2: 184 (1880), excl. syn. *H. Thurberi; Orcutt*, Fl. S. & Lower Cal. 10 (1885); *Macoun*, Cat. 4: 17 (1888); *Coville*, in Contr. U. S. Nat. Herb. 4: 201 (1893); *Rattan*, Fl. 176 (1898); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Jepson*, Fl. Mid. Cal. 182 (1901); *Howell*, Fl. Nw. Amer. 628 (1902), not *H. leucostachys?* Rothr., Bot. Wheeler 265 (1878) (= *H. sparsiflora?*), nor Hems., Biol. Cent. Am. (= *H. Thurberi*).—**H. dilatata** *Bol.*, Fl. San Francisco 29 (1870).—**H. pedicellata** *Wats.*, in Proc. Am. Acad. 12: 276 (1877), Bot. Cal. 2: 184 (1880); *Rattan*, Fl. 176 (1898).—**H. dilatata** and **H. dilatata** VAR. *Wats.*, Bot. King. 340 (1871).—**H. flagellans** *Wats.*, Bot. Cal. 2: 483 (1880).[1]—**H. brevifolia** *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899) in syn., not *Greene.*

Platanthera hyperborea VAR. **leucostachys** *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899), excl. all syn. but *Lindl.*—**P. Ghiesbreghtiana** *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899) in syn., not *Rich. & Gal.*—**P. sparsiflora** *Kränzl.*, Orch. Gen. et Sp. 1: 648 (1899) in syn., not *Wats.*—**P. Thurberi** VAR. **Grayi** *Kränzl.*, Orch. Gen. et Sp. 1: 648 (1899) in syn., not *Wats.*

Limnorchis leucostachys *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 106 (1900), in Bull. Torr. Bot. Cl. 28: 625 (1901); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 210 (1906).—**L. leucostachys** VAR. **robusta** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 626 (1901); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 210 (1906).—**L. Thurberi** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 624 (1901) as to California specimens cited.—L. leptoceratitis *Rydb.*, in Bull. N. Y. Bot. Gard. 2: 162 (1901), in Bull. Torr. Bot. Cl. 28: 624 (1901) as to *Rudkin* specimen.

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[1] This is the plant to which, under the name *H. flagellaris*, Kränzlin refers in *Orch. Gen. et Sp.* It would seem that the "*n*" in "*flagellans*" became "*ri*" in his manuscript. Rydberg states (*Bull. Torr. Bot. Cl.* 28: 612) that *H. flagellaris* was never published, but he does not refer to *H. flagellans* in his monograph and was probably misled by Kränzlin's error.

H. dilatata var. *leucostachys*

"16. Platanthera leucostachys.

"P. caule folioso, foliis oblongo-lanceolatis obtusis, spicâ longissimâ densâ, bracteis florum longitudine, sepalis ovatis obtusis, petalis membranaceis linearibus emarginatis, labello rhomboideo lineari-lanceolato calcare filiformi arcuato duplò breviore, antheræ lobis parallelis rostello maximo plicato.[1]

"Hab. in ora *occidentali Americæ septentrionalis, Douglas.* (*hab. s. sp. comm. Soc. Hort.*)

"Rostellum ferè Gymnadeniæ sed magnum et prominens. Flores verosimiliter albi." Lindl. *loc. cit.*

BRITISH COLUMBIA, Kootenay District

Boggy places, Donald, Columbia Valley, July 4, 1885, *Macoun* (6); swamps, July 13, 1885, *Macoun* (3).

Victoria Co.: Beacon Hill, June 12, 1893, *Macoun* (3, 6).

WASHINGTON

Yakima Region, 1882, *T. S. Brandegee* (no. 480) (4).—Cascade Mts. 49° N. lat., 1859, *Lyall* (3).—1889, *G. R. Vasey* (no. 77) (2, 3).—1880, *J. M. Grant* (no. 11) (9); 1884, *Grant* (2).—Moist ravines, marshes, 5100 ft., head of Poison Creek, September 1, 1897, *M. W. Gorman* (no. 812) (2).—Nason City, July, 1893, alt. 2000–3000 ft., *J. H. Sandberg & J. B. Leiberg* (2).—Kuskuskie River, Capt. Wilkes' Exp. (no. 256) (2).—Open, wet ground, upper valley of the Nesqually, July 10, 1894, *O. D. Allen* (no. 75) (2, 3, 4, 5, 6, 7).

Clallam Co.: Olympic Mts., August, 1900, *A. D. E. Elmer* (no. 2551) (2, 4).

Spokane Co.: Mt. Carleton, July 17, 1902, *Frank O. Kreager* (no. 195) (3).

Kittitas Co.: Slopes of Mt. Stuart, alt. 545 m., July 24, 1893, *Sandberg & Leiberg* (no. 576) (2).

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[1] Lindley's type of *Platanthera leucostachys*, collected by Douglas in 1826, is accompanied by a drawing which represents *retuse* petals. This peculiarity is not characteristic of the flowers of the type.

H. dilatata var. *leucostachys*

King Co.: Seattle, June 25, 1890, *E. C. Smith* (4).—Snoqualmie, June 4, 1889, *Smith* (no. 291) (3, 4).

Thurston Co.: Near Olympia, alt. 500 ft., July 14, 1898, *A. A. & E. G. Heller* (no. 4046) (2, 3, 4, 5, 14).

Klickitat Co.: On wet meadows, Falcon Valley, June 25, 1893, *W. N. Suksdorf* (no. 1356) (1, 2, 3, 4).

Wallawalla Co.: Waitsburg, June 4, 1897, *R. M. Horner* (no. 466) (2).

Columbia Co.: Near springs, Blue Mts., August 10, 1897, *Horner* (no. 467) (2, 3).

OREGON

Cascades, July, 1893, *Mrs. R. M. Austin* (no. 240) (9).—In marshes, June, 1880, *Thos. J. Howell* (2, 4, 16).—1871, *Elihu Hall* (no. 505) (3, 4, 16).—1897, *Edmund P. Sheldon* (nos. 8660, 8261) (2).

Clackamas Co.: Milwaukee, August 9, 1903, *Howell* (1).

Wasco Co.: Paulina Lake, alt. 2100 m., July 23, 1894 (no. 553) (2).—Wet places, Hood River, June 4, 1883, *Joseph Howell* (6).

Klamath Co.: Swan Lake Valley, August, 1894, *Elmer I. Applegate* (no. 692) (3).

Lake Co.: Warner Range, alt. 1900 m., June 25, 1896, *Coville & Leiberg* (no. 30) (2).—Side of Mt. Scott, swamp exposed to sky, alt. 3500 ft., July 21, 1899, *M. A. Barber* (3).

IDAHO

Soldier Mts., alt. 8000 ft., July 16, 1895, *L. F. Henderson* (no. 3348) (2).—Near Reader Creek, alt. 900 m., July 24, 1897, *John B. Leiberg* (no. 2747) (2).—Wet places in the mountains, July, 1892, *A. Isabel Mulford*, (3, 4).—Wet land, shade, May 21, *Rev. Mr. Spalding* (4).

Latah Co.: Marshes in woods, Craig and Moscow Mts., June 23, 1894, *Henderson* (2, 5, 14).

Nez Percés Co.: On the lower Clearwater River, June 2, 1892, *Sandberg, MacDougal & Heller* (no. 288) (2, 3).—Clearwater, *Rev. Mr. Spalding* (3, 9).—Forest, 3500 ft., July 16, 1896, *A. A. & E. Gertrude Heller* (no. 3436) (2).

CALIFORNIA

Between Genter's and the Tuolumne River, 1872, *A. Gray* (3).—Shasta (= Trinity) Mts., 3000–4000 ft. alt., September 1860–2, *W. H. Brewer* (no. 1453 in part) (3).—1875, *G. R. Vasey* (2).—Southern California, June, 1882, *D. Cleveland* (10).—*Thos. Bridges* (no. 356) (2, 3).—Deer Park, Lake

H. dilatata* var. *leucostachys

Tahoe, August, 1896, ***Miss M. E. Parsons*** (9).—Lake Tahoe, July, 1895, ***Mr. Abraham*** (9); July, 1898, ***Mrs. Edward Probert*** (9); ***in uliginosis prope L. Tahoe***, August 31, 1892, ***John H. Redfield*** (4).—Lincoln Valley, July 23, 1901, ***P. B. Kennedy & S. B. Doten*** (9).—Hetch-Hetchy Valley, June, 1900, ***F. T. Bioletti*** (9).—Sierra Nevada Mts., 1875, ***Dr. A. Kellogg*** (9).—School Station, May, 1869, ***Kellogg & Harford*** (no. 958) (2).

Siskiyou Co.: Wet mountain meadow, near camp on Mt. Shasta, August 22, 1880, ***G. Engelmann*** (4).—Near Shasta Springs, June, 1899, ***O. Ames*** (1). —In grass beside railroad track, Moss Brae Falls, June, 1899, ***Ames*** (1). —Foot of Mt. Eddy, 4000 ft., August 17, 1903, ***E. B. Copeland*** (no. 259) (1).—Sisson, alt. 3555 ft., June 1–10, 1897, ***H. E. Brown*** (no. 320) (2, 3, 4, 5, 9).—Mt. Shasta and vicinity, July 13–27, 1892, ***Dr. Edward Palmer*** (no. 2568) (2, 5).

Modoc Co.: Sugar-Loaf Hill Swamp, August, 1885, ***Mrs. R. M. Austin*** (9).

Shasta Co.: Mountains about head-waters of the Sacramento River, 6500 ft., August 31, 1881, ***C. G. Pringle*** (7).

Trinity Co.: Cañon Creek, July 2–18, 1901, ***Alice Eastwood*** (9).

Plumas Co.: Indian Valley, ***J. G. Lemmon*** (3) (type of ***H. flagellans*** Wats.). —***Mrs. Austin*** (5); 1877, ***Mrs. Austin*** (3, 5, 6); 1880, ***Mrs. Austin*** (2, 16). —Prattville, July, 1902, ***Mrs. A. L. Coombes*** (9).—Butterfly Valley, August, 1896, ***Mrs. Austin*** (no. 540) (4).

Mendocino Co.: 1876, ***Vasey*** (3).—Oak Hills near Ukiah Valley, June 10 (1).—Swamp, August 6, 1902, ***J. W. Congdon*** (2).

Butte Co.: Butte Creek, July, 1896, ***Mrs. C. C. Bruce*** (2, 4); July, 1896, ***Mrs. Austin*** (no. 6) (4).—Colby Ranch, Butte Creek, August, 1902, ***Bruce*** (9).

Sierra Co.: 1874, ***J. G. Lemmon*** (3, 16).

Nevada Co.: Lower end of Donner Lake, July 13, 1903, ***A. A. Heller*** (no. 6919) (1, 2, 3, 4, 9).

Lake Co.: Drew's Creek, ***Mrs. Austin*** (no. 243) (9).—Susanville, four miles below Eagle Lake, alt. 5000 ft., June 30, 1897, ***M. E. Jones*** (2, 4).—In the "Horse Pasture" near the summit of Mt. Sanhedrin, July 20, 1902, ***Heller*** (no. 5999 in part) (1, 2, 3, 4, 9).

Placer Co.: Summit Soda Springs, June 12, 1898, ***Eastwood*** (9).—Cisco, June 21, 1870, ***Dr. Kellogg*** (9).

Eldorado Co.: Tallac, July 8, 1897, alt. 6200 ft., ***Ezra Brainerd*** (5).— "Meadows," near Meisner's Sheep-ranch, July 17, 1897, alt. 7600 ft.,

H. dilatata var. *leucostachys*

Brainerd (7).—Tallac, Lake Tahoe, alt. 6280 ft., *Dr. F. C. Blaisdell* (no. 81) (9).—Slippery Ford, summer, 1903, *Mrs. F. M. Meigs* (9).—Fallen Leaf Lake, June 28, 1900, *Wm. W. Price* (9).

Amador Co.: Pioneer, July 13, 1896, alt. 3500 ft., *Geo. Hansen* (no. 1850) (2, 4, 9).—Tiger Creek, 4000 ft., July, 1892, *Hansen* (no. 1257) (4).

Marin Co.: Sausalito Ravine, May 5, 1870, *Kellogg & Brannan* (9); woodless ravines, May 23, 1868, *Kellogg* (9).

Tuolumne Co.: Lord's Ranch, 5300 ft., July 7, 1888 (9).

San Francisco Co.: Visitacion Valley, June 1, 1901, *Miss E. Cannon* (9).—Swamps near San Francisco, 1860–2, *Bolander* (3).

Mariposa Co.: Hopkin's Creek, above Yosemite, 1873, *Lemmon* (3).—Yosemite Valley, June 1860–2, *Brewer* (no. 1671) (3); July, 1866, *Bolander* (no. 4936) (4, 9, 16).—Mariposa Grove, July 30, 1893, *Eastwood* (9).

Mono Co.: Mammoth, July 22, 1891, *Coville & Funston* (no. 1822) (2, 3).

Fresno Co.: October, 1890, *Mrs. Rawson Peckinpah* (2).—King's River, 1876, *Dr. G. Eisen* (9).—Sequoia Mills, Millwood, July 18, 1893, *Eastwood* (9); July 16, 1892, *T. S. Brandegee* (9); July 19, 1892, *Brandegee* (9).—Pine Ridge, 5000 ft., June 15–25, 1900, *Hall & Chandler* (no. 150) (4, 2, 9).—Fresno, 1902, *Chas. E. Jenney* (no. 115) (9).

Inyo Co.: Mono Lake, July, 1860–2, *Brewer* (no. 1834) (3).—Borders of Oak Creek, Camp Independence, 5000 ft., 1877, *Dr. M. Matthews* (4).—Onion Valley, June 30, 1899, *S. W. Austin* (no. 254) (9).

Monterey Co.: Point Sur, July, 1888, *Brandegee* (9).

Tulare Co.: Halstead Meadows, Sequoia Park, alt. 2150 m., August 8, 1891, *T. S. Palmer* (no. 2096) (2).—Kaweah River Valley, July 28, 1891, *Coville & Funston* (no. 1335) (2); south fork of Kaweah River, 4500 ft., July 21, 1904, *Culbertson* (no. 4245) (1).—Kern River, near lakes, July 16, 1903, *Eastwood* (9).—Mineral King, July 13, 1903, *Eastwood* (9).—Grassy swamps, 8000–9000 ft., July 14, 1888, *Dr. E. Palmer* (no. 223) (2).

San Bernardino Co.: San Bernardino, *W. G. Wright* (no. 802) (9).—Bluff Lake, San Bernardino Mts., *Miss Pettibone* (no. 41) (15).—Bear Valley, San Bernardino Mts., August, 1882, *S. B. & W. F. Parish* (no. 1521) (3, 4, 8).—Edgar Cañon, San Bernardino Mts., alt. 3000 ft., June 13, 1894, *S. B. Parish* (no. 3134) (2, 4, 9).

San Diego Co.: Along creeks at 8000 ft., San Jacinto Mt., July 22, 1897, *H. M. Hall* (no. 727) (2); August, 1901, *Hall* (no. 2513) (2, 9). — San Jacinto Mt., June, 1880, *S. B. & W. F. Parish* (no. 670) (15).

H. dilatata var. *leucostachys*

NEVADA, Elko County

Ruby Valley, 6000 ft., August, 1868, *S. Watson* (no. 1152 in part) (2). — East Humboldt Mts., alt. 6500 ft., August, 1868, *Watson* (no. 1154) (3).

Washoe Co.: Base of Sierra Mts., near Washoe Lake, *Dr. C. L. Anderson* (no. 7) (3). — Abundant in moist meadows, Washoe Valley, 1901, *Grace G. Niles* (1).

Ormsby Co.: King's Cañon, 1700–2000 m., June 21, 1902, *C. F. Baker* (no. 1111) (2, 3, 7).

Nye Co.: Toyabe Mts., 5500 ft., July, 1868, *Watson* (no. 1153 in part) (2, 3).

UTAH

Southern Utah, 1877, *Dr. E. Palmer* (no. 461) (2, 4, 16).

ARIZONA

1881, *G. R. Vasey* (2).

8. **H. hyperborea** (*L.*) *R. Br.*, Prodr. 312 (1810), in Ait. Hort. Kew. ed. 2, 5: 193 (1813); *Richardson*, in Frankl. Journ. App. 750 (1823); *Lindl.*, in Donn's Hort. Cant. ed. 10: 332 (1823); *Spreng.*, Syst. Veg. 3: 688 (1826); *Gray*, in Ann. Lyc. Nat. Hist. N. Y. 3: 232 (1836); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Gray*, Man. ed. 5, 500 (1867), ed. 6, 507 (1890), Field, For. & Gard. Bot. ed. 1, 325 (1868), rev. ed. 408 (1895); *Wats.*, Bot. King. 340 (1871); *Porter & Coulter*, Synop. Fl. Col. 132 (1874); *Rothr.*, Bot. Cent. Col. 51 (1874); *Rothr.*, Bot. Wheeler 265 (1878); *Wats.*, Bot. Cal. 2: 134 (1880); *Arthur*, in Proc. Dav. Acad. Nat. Sci. 3: 2 (1880); *Day*, Pl. Buffalo 139 (1882); *Perkins*, Gen. Cat. Vt. 37 (1882); *Upham*, Fl. Minn. 140 (1884); *Coulter*, Rocky Mt. Bot. 342 (1885); *Dudley*, Cayuga Fl. 95 (1886); *Brendel*, Fl. Peor. 60 (1887); *Perkins*, Fl. Vt. 277 (1888); *Macoun*, Cat. 4: 14 (1888); *Britton*, Cat. N. J. 234 (1889); *Macoun*, Check-list 53 (1889); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Fernald*, in Portl. Cat. 64 (1892); *MacMillan*, Metasp.

H. hyperborea

H. hyperborea Minn. Val. 167 (1892); *Rand & Redf.*, Fl. Mt. Desert 158 (1894); *Baldw.*, Orch. N. Eng. 69 (1894); *Rydb.*, in Contr. U. S. Nat. Herb. 3: 180 (1895), 3: 524 (1896); *Britton & Br.*, Ill. Fl. 1: 462, f. 1100 (1896); *Nelson*, Fl. Wyo. 181 (1896); *Clute*, Fl. Up. Susq. 105 (1898); *Mill. & Whit.*, Wild Fl. Northeast. St. 556, fig. (1898); *Saunders*, Fl. S. Dak. 180 (1899); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Driggs*, Fl. Conn. 16 (1901); *Bissell & Andrews*, Fl. Southington 36 (1902); *Mathews*, Field-book 86, 87, fig. (1902); *Howell*, Fl. Nw. Am. 628 (1902); *Kennedy*, Fl. Willoughby in Rho. 6: 111 (1904); *Jelliffe*, Gibson's Nat. Orch. 36, t. 17, f. 1 (1905).

Orchis hyperborea *L.*, Mant. 121 (1767), Syst. Veg. ed. 14, 810 (1784), ed. 15, 854 (1797); *Gunn.*, Fl. Norv. 2: 103 (1772); *Oed.*, Fl. Dan. t. 333 (1770); *Houttuyn*, in Linn. Pfl. Syst. 11: 567 (1784); *Retz.*, Obs. Bot. 4: 30, t. 3 (1786); *Poir.*, in Lam. Encyc. 4: 598 (1797); *Sw.*, in Act. Holm. 21: 207 (1800); *Pers.*, Syn. 2: 505 (1807); *Martyn*, in Mill. Dict. ed. 9, no. 42 (1807); *Nutt.*, Gen. 2: 189 (1818); *Eaton & Wr.*, N. A. Bot. ed. 8, 334 (1840); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 41, 582 (1856); *Provanch.*, Fl. Canad. 2: 565 (1862).—**O. Koenigii** *Gunn.*, Fl. Norv. 2: 103 (1772); *Retz.*, Fl. Scand. 1: 628 (1779); *Sw.*, in Act. Holm. 21: 208 (1800); *Pers.*, Syn. 2: 505 (1807); *Spreng.*, Syst. Veg. 3: 688 (1826).—**O. huronensis** *Nutt.*, Gen. 2: 189 (1818).

Habenaria dilatata *Big.*, Fl. Bost. ed. 2, 319 (1824) in part; *Torr.*, Comp. 318 (1826) in part; *Dewey*, Herbaceous Pl. Mass. 198 (1840).—**H. huronensis** *Spreng.*, Syst. Veg. 3: 688 (1826); *Torr.*, Comp. 318 (1826); *Beck*, Bot. ed. 1, 348 (1833); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840).—**H. borealis** VAR. **viridiflora** *Cham.*, in Linnæa 3: 28 (1828).

(1898) in part, not *Wats.*—**H. filifera** *Kränzl.*, Orch. Gen. et Sp. 1: 818 (1898), in syn., not *Wats.*—**H. jaliscana** *Kränzl.*, Orch. Gen. et Sp. 1: 818 (1898), in syn., not *Wats.*

H. clypeata

"24. HABENARIA clypeata.

"H. foliis parvis ovatis cuspidatis sensim decrescentibus, racemo multifloro, bracteis foliaceis cucullatis acuminatis ovario brevioribus, petalis bipartitis: laciniis anterioribus linearibus horizontalibus posticis cum sepalo supremo rotundato galeam orbiculatam planam efficientibus, labelli penduli tripartiti laciniâ intermediâ lineari-lanceolatâ lateralibus linearibus paulò longiore, calcare compresso ovarii longitudine.

"Hab. in *Mexico, de Karwinski.* (*exam. s. sp. in hb. Reg. Monac.*)

"Caulis pedalis. Racemus oblongus, multiflorus. Galea orbiculata plana facie omninò peculiari hanc speciem induit." Lindl. *loc. cit.*

There is no type specimen of this in Lindley's herbarium, but it is quite probable that sketches of a plant, flower, and petal therein contained were made from Karwinski's material, which should be in the royal herbarium at Monaco. That these sketches were from this source is the more likely as similar sketches represent the other species founded on Karwinski's collection. If this view is correct, these sketches prove that the general conception of *H. clypeata* held by authors is the correct one. It is represented by a mixture of two or three species in the herbaria of Kew, the British Museum, and the Muséum d'Histoire Naturelle de Paris. Perhaps the most closely related species is *H. lactiflora* Rich., which may be distinguished by the lateral divisions of the broader labellum that arise from near its middle and reach beyond the mid-lobe. In *H. clypeata* the lateral lobes arise from near the base of the middle lobe which they scarcely

H. hyperborea

Platanthera hyperborea VAR. **major** and VAR. **minor** *Lange*, Consp. Fl. Groenl. 118 (1880).

Limnorchis hyperborea *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 104 (1900), in Britton's Man. 294 (1901), in Bull. Torr. Bot. Cl. 28: 620 (1901); *House*, in Torreya 8: 51 (1908); *Small*, in Porter's Fl. Pa. 93 (1903).—**L. media** *Rydb.*, in Britton's Man. 294 (1901) in part, in Bull. Torr. Bot. Cl. 28: 618 (1901) in part.—**L. huronensis** *Rydb.*, in Britton's Man. 294 (1901), in Bull. Torr. Bot. Cl. 28: 619 (1901); *House*, in Torreya 8: 51 (1908).—**L. brachypetala** *Rydb.*, in Bull. N.Y. Bot. Gard. 2: 161 (1901), in Bull. Torr. Bot. Cl. 28: 616 (1901) in part (*Tarleton* no. 116).—**L. viridiflora** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 616 (1901); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 210 (1906); *Farr*, in Contr. Bot. Lab. Univ. Pa. 3: 28 (1907).—**L. major** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 617 (1901).

"33. ORCHIS bulbis fasciculatis, nectarii cornu longitudine germinis: labio lineari integerrimo truncato. *Kônig.*

"*Habitat in* Islandia. *Kônig.*

"Caulis *palmaris cum spica.* Folia *alterna, lanceolata, longitudine caulis.* Spica *ovata:* Bracteis *lineari-lanceolatis, longitudine florum.* Corollæ *viridi-lutescentes: Petalum supremum latius, ovatum; Lateralia 2 superiora lanceolata, ad primum conniventia; Lateralia 2 inferiora oblonga. Labium vix petalo longius.*" L. Mant. *loc. cit.*

I have been obliged, as in my treatment of *H. dilatata*, to reduce several of Dr. Rydberg's species, as they are founded rather on geographic and inconstant distinctions than on real differences.

In *Habenaria hyperborea* we have, from every viewpoint, a perplexing species which presents many problems. The most difficult point to settle is the amount of variation we are to allow

H. hyper-borea

in a species so clearly polymorphic. Many careful observers have expressed the opinion that *H. hyperborea* is excessively variable, and that it includes not only the form which is represented by the Linnæan type, but the variants which some botanists have regarded as specifically distinct.

The plant in the Linnæan herbarium is a boreal form of unusual aspect. Dr. Rydberg is inclined to regard it as separable from the plant which has been found so common in the northeastern part of the United States and Canada, and which has been identified as *Habenaria hyperborea* by the majority of American botanists. On the other hand Dr. Kränzlin is emphatic in his views expressed in his *Orchidacearum Genera et Species*, where he makes the synonymy of *H. hyperborea* a repository for the species which are regarded as distinct in most American botanical works. He has been Draconian in his treatment of the species allied to *H. hyperborea*, and of these he has considered as variants several which appear to have no close relationship with that species. The contrast between the views of Kränzlin and Rydberg is so radical that it induces caution in accepting their opinions. They view from diametrically opposite standpoints the phenomena of variation and polymorphism, and consequently they both pass to extremes which are significant and at the same time instructive.

In my studies of *Habenaria hyperborea* I have examined numerous specimens both fresh and dried, and aside from observations made in the field I have kept many plants under cultivation, where I could examine them throughout their growing season. I am convinced that it is futile to multiply the number of our species by paying close attention to minor traits, such as relative length of spurs and lips and comparative thickness of spurs. When I examined the specimen preserved in the Linnæan herbarium I was unable to discover any constancy in the

H. hyperborea form of the spurs in accordance with Dr. Rydberg's descriptions. Aside from its dwarfness there is no character which separates the Linnæan plant satisfactorily from the slender *H. hyperborea* of northeastern America.

I cannot agree with Kränzlin's treatment of the species which constitute the Hyperborea group, because I find constant conspicuous differentiating characters for *H. sparsiflora*, *H. saccata*, *H. dilatata*, and *H. brevifolia*,—species which he refers to the synonymy of *H. hyperborea.*

It is quite true that all of these species are closely allied to one another, but extreme forms of any one of them appear to be conspicuously distinct. In this group no satisfactory work can be done which is not based on rich series of specimens taken throughout the range.

NEWFOUNDLAND

Woods, Coal River, July 17, 1896, *A. C. Waghorne* (2); July 14, 1897, *Waghorne* (4).

NOVA SCOTIA, VICTORIA COUNTY

Grand Narrows, Cape Breton Isl., July 27, 1898, *J. Macoun* (6).

CUMBERLAND Co.: Parrsboro, July 10, 1884, *J. Fowler* (2).

NEW BRUNSWICK

Kennebeccosis, July 6, 1871, *J. Fowler* (16).

VICTORIA Co.: By shaded spring, Andover, August 14, 1901, *M. L. Fernald* (3). —Clair's, July 11, 1904, *A. A. Eaton* (no. 107) (1).

YORK Co.: Boggy places, Campbellton, July, 1877, *R. Chalmers* (6).— Grass-land beside railroad at Giroux, July 17, 1905, *O. Ames* (no. 26) (1).

QUEBEC

Peat bogs and wet cold woods, Salt Lake, Anticosti Isl., August 10, 1883, *J. Macoun* (6).

BONAVENTURE Co.: Wet red sandstone bluffs and steep slopes between Balde and Baie des Chaleurs, Bonaventure River, August 5, 6, and 8, 1904, *Collins, Fernald & Pease* (1).—Alluvial thickets between the Forks and

H. hyperborea

Brule Brook, Little Cascapedia River, July 29–30, 1904, *Collins, Fernald & Pease* (1).

Temiscouata Co.: Riviere du Loup, August, 1902, *W. W. Eggleston* (no. 3005) (1).—July 12–13, 1904, *Collins & Fernald* (1).

Ottawa Co.: In swamp, Wakefield, July 27, 1903, *Macoun* (6).

Hochelaga Co.: Montreal, July 5, 1904, *Rev. Robert Campbell* (1).—Wet sand, Lake Mistassini, July 23, 1885, *Macoun* (6).—Ungava, Fort Chimo, Ungava River, August 28, 1896, *W. Spreadborough* (6).

ONTARIO, Algoma District

Moose Factory, James Bay, July 1, 1904, *W. Spreadborough* (6).

Thunder Bay Dist.: Peat bogs and wet cold woods, Lake Nipigon, July 15, 1884, *J. Macoun* (6).

Renfrew Co.: Ashdad, July 23, 1893, *J. Fowler* (2); July 24, 1893, *Fowler* (4).

Carleton Co.: Ottawa, *Wm. Macoun*, July, 1886 (6).

Hastings Co.: Cedar swamps, Belleville, June, 1865, *J. Macoun* (16).

Ontario Co.: In a bog, Wick, June 16, 1894, *W. Scott* (6).

York Co.: Near Toronto, June 17, 1898 (Biltmore no. 2522 b) (5).—Scarboro Heights, Toronto, June 25, 1892, *C. W. Armstrong* (2).—Springy places, Toronto, July 18, 1891, *Scott* (6).—Deep rooted in clay bank, Don River, north of Toronto, August 20, 1897, *J. Dearness* (6).—Rosedale, Toronto, August 21, 1897, *Scott* (6).

Wellington Co.: Wet woods, Edmonton, June 21, 1890, *James White* (6).—Guelph, June 28, 1904, *A. B. Klugh* (1); Killean swamp, July 3, 1904, *Klugh* (1); September 2, 1904, *Klugh* (1).

Huron Co.: Wet cold woods, Wingham, July, 1890, *J. A. Morton* (2, 6).

Welland Co.: Wet ground, Niagara Falls, July 1, 1897, *W. C. McCalla* (no. 333) (5, 6).—Niagara Falls, June 28, 1897, *Scott* (6).

KEEWATIN

Mouth of Equam River, James Bay, July 10, 1901, *D. B. Dowling* (6).—Bogs, Severn River, July 14, 1886, *J. M. Macoun* (6).

MANITOBA

1898, *E. S. Thompson* (4).—In boggy places, near Ellice, June 20, 1879, *J. Macoun* (6).—Ravine at the Insane Asylum, Brandon, July 18, 1896, *Macoun* (6).

H. hyperborea

ATHABASCA

Woods, Athabasca River, lat. 53° 30′, June 26, 1898, *W. Spreadborough* (6).

SASKATCHEWAN

1858, Pallisser's Brit. N. Am. Expl. Expedition, *E. Bourgeau* (3). — In the Muskeg, north of Prince Albert, July 3, 1896, *J. Macoun* (6).

ASSINIBOIA

Damp places, Fannell Creek, Cypress Hills, June 27, 1895, *J. Macoun* (6); Cypress Hills, June 23, 1894, *Macoun* (4, 6); in boggy places, August 6, 1880, *Macoun* (6). — Regina, 1893, *T. W. Willing* (no. 2243) (1).

ALBERTA

Springy places, Red Deer, July, 1895, *H. H. Gaetz* (6). — Bow River at Calgary, August 21, 1883, *J. M. Macoun* (6). — Pipestone Pass, Rocky Mt. Park, July 6, 1904, *J. Macoun* (1); along the Bow River at Laggan, Rocky Mt. Park, July 13, 1904, *Macoun* (1). — Rocky Mt. Park, Banff, July, 1903, *N. B. Sanson* (1). — Wet ground at Cave and Basin, Banff, 4500 ft., July 10, 1899, *W. C. McCalla* (no. 2232) (2, 5). — Waste water from Middle Spring, Banff, July 13, 1899, *Sanson* (6). — In a bog, Elbow Divide, June 22, 1897, *Macoun* (6). — By a spring, Crow Nest Pass, August 3, 1897, *Macoun* (6); peat bogs and wet cold woods, July 18, 1883, *Dawson* (6).

BRITISH COLUMBIA, Yale District

Boggy places, northwest of Spencer's Bridge, June 6, 1899, *J. M. Macoun* (6). — Sheep Creek, south of Rossland, 2000 ft., July 17, 1902, *Macoun* (1). — Boggy places, Sicamous, July 16, 1889, *J. Macoun* (6). Cassiar Dist.: Lakes Lindeman and Takko, June 12–24, 1883, *Lieut. F. Schwatka* (3).

ALASKA

Unalaska, *Chamisso* (3). — Orca, Prince William Sound, June 29, 1899, *Trelease & Saunders* (no. 3294)? (4). — Hidden Glacier Inlet, June 20, 1899, *Trelease & Saunders* (no. 3288) (4). — Muir Inlet, June 12, 1899, *Trelease & Saunders* (no. 3289) (4). — New Metlakahtla, June 4, 1899, *Trelease & Saunders* (no. 3295) (4).

MAINE, Aroostook County

Fort Kent, July 17, 1903, *Dr. D. W. Fellows* (1); swamp back of Eagle House, July 8, 1904, *A. A. Eaton* (no. 14) (1); *Professor Powers* (1); July 10, *O. W. Knight* (1). — In sun and shade, wet places, in grass and spruce swamp, back of Eagle House, July 14, *Eaton* (no. 136) (1). — Wet roadside, in cold spring water, Bickerbrook, three miles east of Fort Kent, July 16, 1904, *Eaton* (no. 152) (1). — Sphagnum bog, three miles west of Fort Kent, July 18, 1904, *Eaton* (no. 169) (1). — Clay soil, on landslide, shore of St. John River, July 10, 1904, *Eaton* (no. 83) (1). — Cold, wet soil, shore of river at Horseback, St. Francis, July 20, 1904, *Eaton* (no. 196). — Clay soil, Ashland Junction, July 7, 1904, *Eaton* (no. 2) (1); turfy soil, July 7, 1904, *Eaton* (no. 3) (1).

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Piscataquis Co.: Wet woods, Dover, September 4, 1894, *M. L. Fernald* (3). — Greenville, July 17, 1888, *Faxon* (3); July 19, 1888, *Faxon* (3).

Somerset Co.: Deep humus in cedar swamp, in wet but well drained soil, Madison, July 2, 1903, *Eaton* (1).

Franklin Co.: Wet field, New Sharon, July 26, 1902, *Clarence H. Knowlton* (1).

Waldo Co.: Moist meadow, Dark Harbor, Islesboro, July 8, 1897, *F. Tracy Hubbard* (1).

Kennebec Co.: Winthrop, 1862, "*J. N. S.*" (4); 1864, Hb. E. L. Sturtevant (4). — Augusta, July 7, 1886, *E. C. Smith.*

Oxford Co.: Norway, *S. I. Smith* (16). — Hartford, July, 1892, *J. C. Parlin* (3).

York Co.: North Parsonsfield, July 10, 1902, *R. G. Leavitt* (1).

NEW HAMPSHIRE, Coos County

Crawford's, July 12, 1889, *Faxon* (3).

VERMONT, Orleans County

Wet place by roadside, Brownington, July 26, 1904, *A. A. Eaton* (no. 232) (1); Tinkham's Bog, July 26, 1904, *Eaton* (no. 231) (1). — Bog back of Willoughby House, Willoughby, July 28, 1904, *Eaton* (no. 248) (1); bog, July 11, 1903, *E. J. Winslow* (1); August 26, 1903, *Winslow* (1); July 15, 1887, *Faxon* (2); June 23, 1885, *Faxon* (3); August 15, 1889, *Faxon* (3); July 28, 1892, *H. H. Rusby* (10). — Mt. Annance, Willoughby Lake, July 2, 1854, *Wm. Boott* (3); swamp between West Burke and Willoughby, July 20, 1887, *Faxon* (3). — Dry woodland, Barton Landing, August 26, 1903, *Winslow* (1).

Caledonia Co.: Peacham, June 29, 1884, June 16, 1892, *Dr. F. Blanchard* (4); June 16, 1892, *Mrs. A. F. Stevens* (2). — Sutton, August 17, 1889, *Faxon* (3).

Addison Co.: Salisbury, July 26, 1903, *W. W. Eggleston* (1). — Swamps,

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Monkton, September 26, 1878, *C. G. Pringle* (7).—Middlebury, July 19, 1878, *Ezra Brainerd* (1); Middlebury Mt., June 19, 1878, *Brainerd* (10).—About a large, cold spring, East Middlebury, June 10, 1902, *Brainerd* (1, 3); July 25, 1903, *Eggleston* (1).

Rutland Co.: Swamps, Rutland, July 10, 1892, *Eggleston* (2); August 26, 1903, *Eggleston* (no. 3197) (3).—Pittsford, June 14, 1902, *Eggleston* (no. 2855) (1).

Bennington Co.: Woods, base of Mt. Equinox, Manchester, July 1, 1903, *W. H. Blanchard* (no. 23) (3).—Manchester, July 9, 1898, *M. A. Day* (no. 314) (3).

MASSACHUSETTS, Berkshire County

Wet slopes, below spring in woods, Mt. Greylock (North Adams), August 7, 1902, *Le Roy Andrews* (1).—Vicinity of Tyringham, alt. 900 ft., August 14, 1897, *Anna Murray Vail* (1).—Damp woods, Great Barrington, August, 1898, *C. L. Pollard* (2).

Hampshire Co.: Woodlands, Amherst, June, 1895, *E. L. Morris* (5).

CONNECTICUT

Salisbury, June 8, 1903, *Mrs. O. P. Phelps* (3).

NEW YORK

Cold swamps, New York, *Dr. Gray* (3).

Washington Co.: About ponds, Fort Ann, August 2, 1892, *Stewart H. Burnham* (5).—East Greenwich, 1867, *Dr. Asa Fitch* (10).

Herkimer Co.: Litchfield marshes, June, *Dr. J. V. Haberer* (8); wet places, shade of arbor-vitæ, southwest border of Cedar Lake, July 12, 1903, *Dr. Haberer* (no. 2668) (1); tamarack and arbor-vitæ marshes around Mud Lake, June 4, 1903, *Dr. Haberer* (no. 2671) (1).—Frankfort Hill, June or July, 1874, *Dr. Haberer* (1).—Newport, July 25, 1899, *H. D. House* (18).

Onondaga Co.: New Syracuse, 1891, *F. C. Straub* (2).

Madison Co.: Jamesville, July 19, 1905, *House* (no. 1288) (18).—Wet ground under thujas, Peterboro, July 21, 1900, *G. S. Miller* (2).—Castle swamp, July 6, 1905, *House* (no. 1141) (18).

Otsego Co.: Banks of the Susquehanna, Cooperstown, 1867, *B. D. Gilbert* (4).

Albany Co.: Dry deciduous woods, Alcove, July, 1891, *C. L. Shear* (3).

Yates Co.: Penn Yan, *Dr. S(artwell)* (4); *T. Marshall Fry* (1).

Tompkins Co.: Freeville, May 25, 1878, *Wm. Trelease* (4).—Danby, August 6, 1885, *F. V. Coville* (2).

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PENNSYLVANIA, Chester County
Ex Hb. Wellesley College (2).

MICHIGAN, Keweenaw County
In peninsula Keweenaw, 1863, *Dr. J. W. Robbins* (3); Keweenaw Point, June, 1886, *O. A. Farwell* (1).—Clifton, June 15, 1886, *O. A. Farwell* (no. 371½) (11); wet ground, August, 1884, *F. E. Wood* (2).
Marquette Co.: In swamp of Coniferæ, Turin, June 27, 1901, *Bronson Barlow* (2).
Mackinac Co.: Common, Mackinac, July 26, 1882, *Wm. Trelease* (4); Mackinac Isl., July 15, 1893, *Fritchey* (4).

INDIANA
Low thickets, Miller's, June 19, 1897, *L. M. Umbach* (2, 5).

ILLINOIS, Woodford County
Springy bogs, Spring Mills, July, 1898, *F. E. McDonald* (no. 3034) (14).
Peoria Co.: Peoria, *Dr. F. Brendel* (3).

WISCONSIN, St. Croix County
1861, ex coll. *T. J. Hale* (3).
Brown Co.: June, 1885, *J. H. Schuette* (1).—Depere Ledge, June 10, 1891, *Schuette* (1).
Kewaunee Co.: Kewaunee, July 29, 1892, *Schuette* (1).
Sheboygan Co.: Damp woods, flowering from the last days of May, Elkhart, *Schuette* (1).
Dane Co.: Madison, *S. H. Watson* (16).
Jefferson Co.: Jefferson Junction, June 24, 1887, *Wm. Trelease* (4).
Milwaukee Co.: Milwaukee, 1843, *I. A. Lapham* (3, 4).
Racine Co.: Low meadows, Barnes Prairie, July 2, 1898, *S. C. Wadmond* (5).

MINNESOTA, Chisago County
August, 1892, *B. C. Taylor* (2, 5, 14).—Franconia, July, 1890, *J. M. Holzinger* (2).

SOUTH DAKOTA, Lawrence County
Lead City, alt. 5500 ft., July 8, 1892, *P. A. Rydberg* (no. 1028) (2).

NEBRASKA
Keya Paha River, August 1, 1893, *Fred Clements* (no. 2865) (2).
Sioux Co.: Hot Creek Basin, August 2, 1887, *H. J. Webber* (4).
Thomas Co.: Wet meadow, on the Middle Loup, near Thedford, June 19, 1893, *P. A. Rydberg* (no. 1297) (2, 3).

H. hyperborea **Hooker** Co.: In meadows near the forks of Dismal River, July 12, 1893, *Rydberg* (no. 1297) (2).

MONTANA

Muddy border, Ray Creek, alt. 4500 ft., July 6, 1883, *F. L. Scribner* (no. 267) (3).—Upper Madison River, July 16, 1899, *J. W. Blankinship* (1).

Flathead Co.: Columbia Falls, August 20, 1894, *R. S. Williams* (no. 812) (5).

Lewis and Clarke Co.: Craig, June 21, 1900, *E. V. Wilcox* (no. 331) (2).

Broadwater Co.: By streams near White's Gulch, August 25, 1882, *Wm. M. Canby* (16).

Deerlodge Co.: Deerlodge, July 8, 1895, *P. A. Rydberg* (no. 2608) (4).

WYOMING

La Plata mines, August 23, 1898, *Elias Nelson* (no. 5095) (2).

Uinta Co.: Yellowstone Park, two miles north of Mammoth Hot Springs, August 8, 1887, *L. F. Ward* (2).—*F. H. Knowlton* (2).—Yellowstone River near junction Butte, July 9, 1899, *A. & E. Nelson* (no. 5744) (2, 3, 4).—Wet shady places, Continental Divide, July 11, 1899, *J. W. Blankinship* (1).—Mammoth Hot Springs, July 5, 1899, *Blankinship* (1).—Amethyst Creek, 7500 ft., August 21, 1887, *L. F. Ward* (2).—Near Firehole River, August 19, 1892, *A. Isabel Mulford* (4).—Pebble Creek July, 1885, *Frank Tweedy* (nos. 492, 493) (2, 14).

Bighorn Co.: Pass Creek, Bighorn Mts., 4000 ft., July 23, 1890, *Blankinship* (no. 235) (1).

Fremont Co.: Marshy places, Wind River, July 28, 1881-2, *W. H. Forwood* (2).—Big Wind River, August 8, 1894, *Aven Nelson* (no. 725) (2, 3, 4).

Carbon Co.: Elk Mt., July 16, 1899, *E. E. Little & E. M. Stanton* (no. 161) (4).

Albany Co.: In open wet meadows, Centennial, July 26, 1900, *Nelson* (no. 7686) (3, 4, 7).—Centennial Hills, August 17, 1895, *Nelson* (no. 1706) (5).

COLORADO

1862, *Hall & Harbour* (no. 535) (3, 4, 16).—East River, August 13, 1873, *J. M. Coulter* (2).

Larimer Co.: Swamp border, North Park, near Teller, alt. 8000 ft., August 4, 1884, *C. S. Sheldon* (no. 180) (2).—In wet soil, La Porte, 5100 ft., June 25, 1896, *L. H. Pammel* (no. 340) (4).—Jack Brook, 2600 m., July 3, 1901, *F. E. & E. S. Clements* (no. 240) (3, 4).

H. hyperborea

Grand Co.: Grand Lake, August, 1888, *E. W. D. Holway* (2).

Garfield Co.: Alpine swamp near Walling's Mill, August 9, 1870, *E. L. Greene* (no. 378) (3).

Summit Co.: Near Breckenridge, alt. 9800 ft., August, 1901, *K. K. Mackenzie* (nos. 202, 202 a) (4, 5).

Clear Creek Co.: Damp places in the valley near Empire, about 8500 ft. alt., July 14–August, 1892, *H. N. Patterson* (no. 262) (3, 4, 10).—Open grassy places on upper Clear Creek, July, 1861, *C. C. Parry* (no. 356) (3 in part, 4).—Banks of Clear Creek, vicinity of Georgetown, June 28–August 7, 1875, *Patterson* (1).

Lake Co.: Twin Lakes, July, 1873, *John Wolf* (no. 964) (2, 4), (no. 965) (2).

Gunnison Co.: Crested Butte, August, 1891, *Alice Eastwood* (9).—Gunnison, 1889, *B. W. Everman* (2); 7680 ft., July 7, 1901, *C. F. Baker* (no. 364) (1, 2, 3, 4).

Chaffee Co.: Low wet grounds, Buena Vista, 8000 ft., July 5, 1892, *C. S. Sheldon* (no. 275) (2); 7970 ft., *Sheldon* (no. 584) (2).

El Paso Co.: Palmer Lake, July, 1890, *Eastwood* (9).

Hinsdale Co.: Swamp below Lake City, June 26, 1878, *F. N. Pease* (no. 73); July 15, 1878, *Pease* (nos. 79, 154) (3).

La Plata Co.: Durango, alt. 7500 ft., August 2, 1896, *Frank Tweedy* (no. 480) (2); La Plata Mts., August, 1892, *Eastwood.*—Upper La Plata Basin, July, 1898, *Baker, Earle & Tracy* (1).

Archuleta Co.: Piedra, 7000 ft. alt., July, 1899, *C. F. Baker* (no. 265) (2 in part, 3, 4, 5).

Las Animas Co.: Gulnare, 1904, *Alice Phelps* (9).

UTAH

Sandy soil, wet bottoms, Dyer Mine, Uintah Mts., July 12, 1902, *Leslie N. Goodding* (no. 1328) (3, 4).

Cache Co.: Wet meadow, June 24, 1897, *J. H. Linford* (5).

Utah Co.: American Fork Cañon, August, 1880, *M. E. Jones* (3).

Sevier Co.: Gravel, Fish Lake, 9000 ft., August 3, 1894, *Jones* (no. 5730) (4).

IDAHO, Blaine County

Marsh, fork of Wood River, alt. 6000 ft., July 25, 1895, *L. F. Henderson* (no. 3588) (2).

H. hyperborea

BEAR LAKE Co.: Bear Lake, August 8, 1898, *A. Isabel Mulford* (no. 277) (4).

ICELAND

Near Akureyri, June 21, 1895, *Miss Elizabeth Taylor* (3).—Hb. L.

GREENLAND

Engelskmandens Havnv. Godhavn, July 20, 1885, *Eug. Warming & Th. Holm* (3).—Godhavn, 1870, *Bryssen* (3).—Ilua, 59° 55′ N. lat. 1889, *Dna E. Lundholm* (4).

H. hyperborea var. *purpurascens*

H. hyperborea VAR. **purpurascens** (*Rydb.*) comb. nov.

Limnorchis purpurascens *Rydb.*, in Bull. Torr. Bot. Cl. 28: 269 & 615 (1901).

"A rather stout plant, 3–5 dm. high, with fleshy-fibrous roots. Leaves ovate to lanceolate, acute, 6–10 cm. long, 1.5–3 cm. wide, dark green: bracts lanceolate, the lower exceeding the flowers: spike rather dense: flowers 10–12 mm. long: lateral sepals green, oblong-linear, or linear, obtuse, 4–5 mm. long; the upper sepal tinged with purple, broadly ovate, erect, obtuse: petals slightly shorter, erect, purple, lanceolate, oblique: lip broadly linear-lanceolate, about 5 mm. long, purplish, scarcely at all dilated at the base, the edges almost straight: spur scarcely more than half as long as the lip, much thickened and saccate.

"This species belongs to the *L. hyperborea* group, and is perhaps nearest related to that species. It differs, however, in the purple petals and lip and the shorter and more saccate spur. The spur has almost the same form as that of *L. stricta;* but from that species it differs in the dense spike and the broader lip. *L. purpurascens* grows in damp woods at an altitude of 2700–3000 m.

"COLORADO: Iron Mountain, 1900, *Rydberg & Vreeland, 6414* (type); Manitou, 1900, *Fred Clements, 172;* Georgetown, 1878, *M. E. Jones, 314.*" Rydb. *loc. cit.*

This plant when well developed can be distinguished readily by its very saccate spur, but it passes so gradually into the typical form of *H. hyperborea* that it is not worthy of more than varietal rank. Dr. Rydberg describes the flowers as purplish. It is to be regretted that this indefinite term has been used to characterize the flowers of a species of the *H. hyperborea* group.

H. hyperborea var. *purpurascens*

COLORADO

July, 1877 (2).

LARIMER Co.: Mountains, 9500 ft., July 7, 1896, *C. S. Crandall* (4).

GRAND Co.: From head-waters of Clear Creek and alpine ridges east of Middle Park, 1861, *C. C. Parry* (no. 356 in part) (3).

CLEAR CREEK Co.: Georgetown, June 27, 1878, *M. E. Jones* (no. 314) (2).

EL PASO Co.: Ute Pass, July, 1886, *Wm. Trelease* (4).—Crystal Park, near Manitou, August 14, 1885, *Fritchey* (4).

DOLORES Co.: Rico, alt. 10,000 ft., July 15, 1895, *Frank Tweedy* (no. 126) (2).—Common in wet places at altitude of 9000 ft. and above, west La Plata Mts., June 28–July 8, 1898, *Baker, Earle & Tracy* (no. 277) (2, 3, 4, 5, 10, 14). (Most of these are characteristic, but some immature specimens are doubtful.)

NEW MEXICO

Santa Fe Mts., August (1884?), *F. H. Snow* (2).—Hermit's Peak, 1884, *Snow* (15).—Along streams, Mogollon Mts., July 19, 1881, *H. H. Rusby* (no. 399 in part) (2).

9. **H. behringiana** (*Rydb.*) comb. nov.

H. behringiana

Limnorchis behringiana *Rydb.*, in Bull. Torr. Bot. Cl. 28: 620 (1901).

"Stem low, 1–1.5 dm. high, about 3-leaved: tubers elongated fusiform, about 5 mm. thick: lower leaf ovate-lanceolate, about 5 cm. long and 1.5–2 cm. wide; the upper lanceolate and smaller: spike dense, 3–4 cm. long; bracts linear-lanceolate, the lower about twice as long as the flowers: flowers purplish, about 12 mm. long: upper sepal ovate, obtuse, 4–5 mm. long; the lateral ones

H. behringiana oblong: petals equalling the sepals, broadly lanceolate; lip about 5 mm. long; spur fully 10 mm. long, filiform. (Fig. 9.)

"Asia: Behring Island, 1891, *British Behring Sea Commission, 143* (type in herb. Columbia Univ.)." Rydb. *loc. cit.*

This is not closely related to any other American species. The type specimens were labelled *Habenaria gracilis* Wats., with which species it has little in common.

Dr. Rydberg describes the flowers as purplish. I think that he must be in error regarding this detail. From dried specimens—the only ones which I have seen—the flowers appear to have been greenish.

ASIA, Bering Island
July, 1891, *Grebnitzky* (6); August, 1891, *Grebnitzky* (no. 143) (4).
NORTH AMERICA, Attu Island (?)[1]
August 29, 1891, *J. M. Macoun* (no. 221) (3, 6); August 28, 1891, *Macoun* (7).

H. saccata 10. **H. saccata** *Greene*, in Erythea 3: 49 (1895).

Platanthera gracilis *Lindl.*, Gen. & Sp. Orch. 288 (1835); *Hook.*, Fl. Bor. Am. 2: 198 (1839); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Kränzl.*, Orch. Gen. et Sp. 1: 639 (1899); *Piper & Beattie*, Fl. Palouse 49 (1901).—**P. stricta** *Lindl.*, Gen. & Sp. Orch. 288 (1835); *Hook.*, Fl. Bor. Am. 2: 199 (1839); *Steud.*, Nomencl. ed. 2, 2: 352 (1841); *Kurtz*, in Engl. Bot. Jahrb. 19: 408 (1895); *Piper*, Fl. Mt. Rainier in Mazama 2: 111 (1901).—?**P. dilatata** γ **gracilis** *Ledeb.*, Fl. Ross. 4: 71 (1853).

Habenaria gracilis *Wats.*, in Proc. Am. Acad. 12: 277

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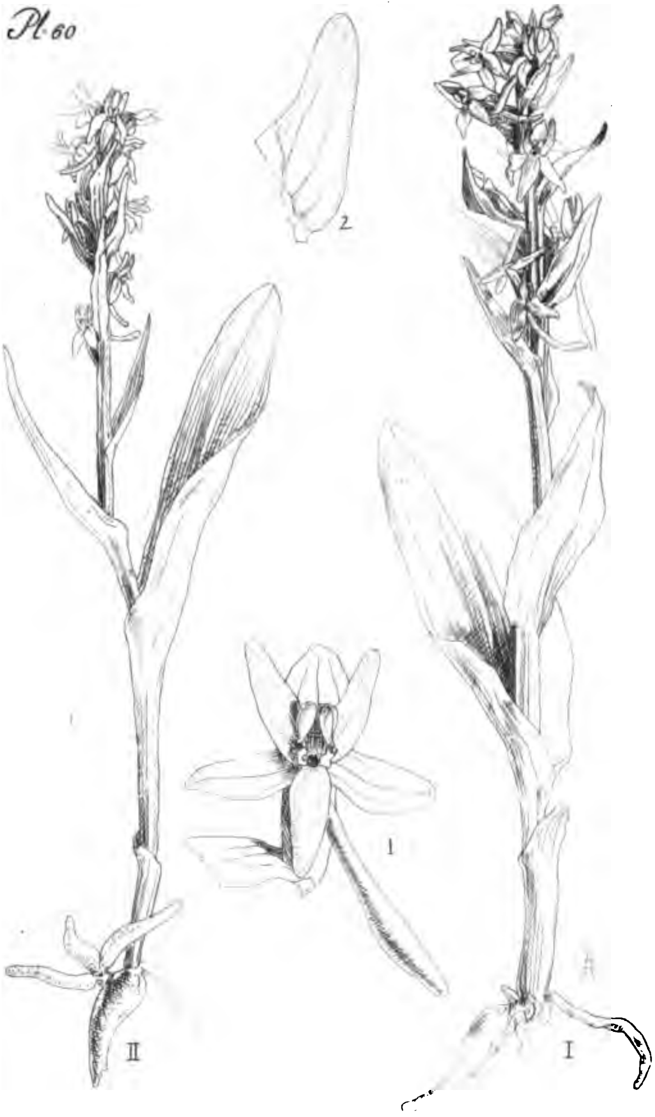
[1] The specimens in hb. 6 are not uniform. On the upper half of the sheet are three plants of *H. behringiana* which, in a note, J. Macoun has attributed to Grebnitzky, who collected them on Bering Island. On the lower half of the sheet are two specimens of *H. viridis* var. *bracteata*. The label which originally accompanied these five specimens tells that they were found in boggy spots, Attu Island, by J. M. Macoun in August, 1891. As Macoun's note refers directly to the specimens of *H. behringiana* it is impossible to state definitively that they came from North America. Presumably the specimens of *H. viridis* var. *bracteata* were collected on Attu Island.

Pl. 60



HABENARIA *behringiana (Rydb.)*

PLATE 60. *Habenaria behringiana*

Plants, natural size, reproduced from the specimens collected by Grebnitzky (I) on Bering Island, and by Macoun (II)? on Attu Island. 1. Flower, enlarged. 2. Petal, enlarged.

H. saccata (1877), Bot. Cal. 2: 135 (1880); *Macoun*, Cat. 4: 15 (1888); *Grace E. Cooley*, in Bull. Torr. Bot. Cl. 19: 245 (1892); *Rattan*, Fl. 177 (1898); *Howell*, Fl. Nw. Amer. 628 (1902), not *H. gracilis* Colebr., in Hook., Exot. Fl. 2, pl. 135 (1825), nor Lindl., Gen. & Sp. Orch. 312 (1835), nor Reichb. f., in Flora 48: 180 (1865).—**H. dilatatiformis** *Rydb.*, in Bull. Torr. Bot. Cl. 24: 189 (1897) in part.—**H. stricta** *Rydb.*, in Bull. Torr. Bot. Cl. 24: 189 (1897), not *H. stricta* Rich. & Gal., in Ann. Sci. Nat. ser. 3, 3: 29 (1845), nor Ridley, in Journ. Linn. Soc. 21: 510 (1885).

Limnorchis stricta *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 105 (1900), in Bull. Torr. Bot. Cl. 28: 614 (1901), excl. syn. *Habenaria hyperborea; Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 210 (1906).—**L. brachypetala** *Rydb.*, in Bull. N. Y. Bot. Gard. 2: 161 (1901), in Bull. Torr. Bot. Cl. 28: 616 (1901) as to type (*Williams*, Bennett City).—**L. gracilis** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 627 (1901), excl. spec. cit. *Onion.*—**L. laxiflora** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 630 (1901) as to specimens *Wilkes & Hall; Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 210 (1906).

"Two feet high or more, slender, rather conspicuously leafy up to the lax and not long, bracted raceme of green flowers: base of the stem with a single quite ample subscarious sheath: leaves lanceolate, acute, 3 or 4 inches long, spreading; bracts of the raceme linear-lanceolate, surpassing the flowers: lateral sepals oblong-lanceolate, the upper ovate-oblong and shorter: lateral petals falcate; lip linear, much longer than the short and thick sac-like spur: capsule sessile." Greene, *loc. cit.*

Platanthera gracilis Lindl. "P. caule folioso, foliis linearibus acuminatis obtusis debilibus patentibus, spicâ laxâ elongatâ floribus inferioribus remotis, bracteis angustis acuminatis floribus longioribus, petalis obliquis acuminatis obtusis, labello lineari obtuso calcaris apice inflati obtusissimi longitudine.

“Hab. in ora *occidentali Americæ septentrionalis, Menzies; H. saccata* Observatory inlet. *Herb. Hooker.* (*hab. s. sp. comm. cel. Menzies.*)

“Caules debilis, 1½-2-pedales. Folia 3-poll. longa, parùm acuminata, nullo modo acuta.” Lindl. *loc. cit.*

I have studied Lindley’s type specimens of *Platanthera gracilis* and *P. stricta* in conjunction with numerous specimens, selected for comparison, from my own herbarium. *P. gracilis* is a slender plant with linear, obtuse or acute leaves. *P. stricta,* on the other hand, is a stout plant with rather broad leaves; ovate-lanceolate according to Lindley’s description. I have found that the only characters which Lindley employed to separate these species are inconstant, and consequently negligible. Aside from these characters used by Lindley there are no others that I have been able to discover which may be used to separate *P. gracilis* from *P. stricta.* (Plate 61.)

NORTHWEST AMERICA

1830, *Douglas* (type of *Platanthera stricta* in Hb. Kew.).

ALASKA

1867, *A. Kellogg* (no. 132) (9).—Along the Ankow River, about ten kilometers above its mouth, July 16, 1891, *Frederick Funston* (no. 64) (3, 4, 6).—On mountain top at timber-line, 3500 ft., also below, near tide-water, about Sitka, July, 1891, *W. G. Wright* (no. 1559) (1, 4, 15, 22).—Kadiak, July 3, 1899, *Trelease & Saunders* (no. 3293) (4).—Bennett City, August 25, 1899, *R. S. Williams* (22) (type of *Limnorchis brachypetala*).

BRITISH COLUMBIA, Cassiar District

Observatory Inlet, *Menzies* (type of *Platanthera gracilis* in Hb. Kew.).—Lake Lindeman, near boundary of Yukon Terr., July 8, 1902, *J. Macoun* (1).

New Westminster Dist.: Swampy places, Burrard Inlet, July 22, 1889, *Macoun* (6).

Kootenay Dist.: Glacier, August 21, 1903, *Chas. Schaffer* (1).—Trail, June 5, 1902, *J. M. Macoun* (1).—Swamps, Revelstoke, May 28, 1890, *J. Macoun* (6).—Trout Lake, 1903, *E. Wilson* (1).—Armstrong, 1903, *Wilson* (1); in wet land along mountain stream, July 15, 16 and 18, 1904, *Wilson* (1).

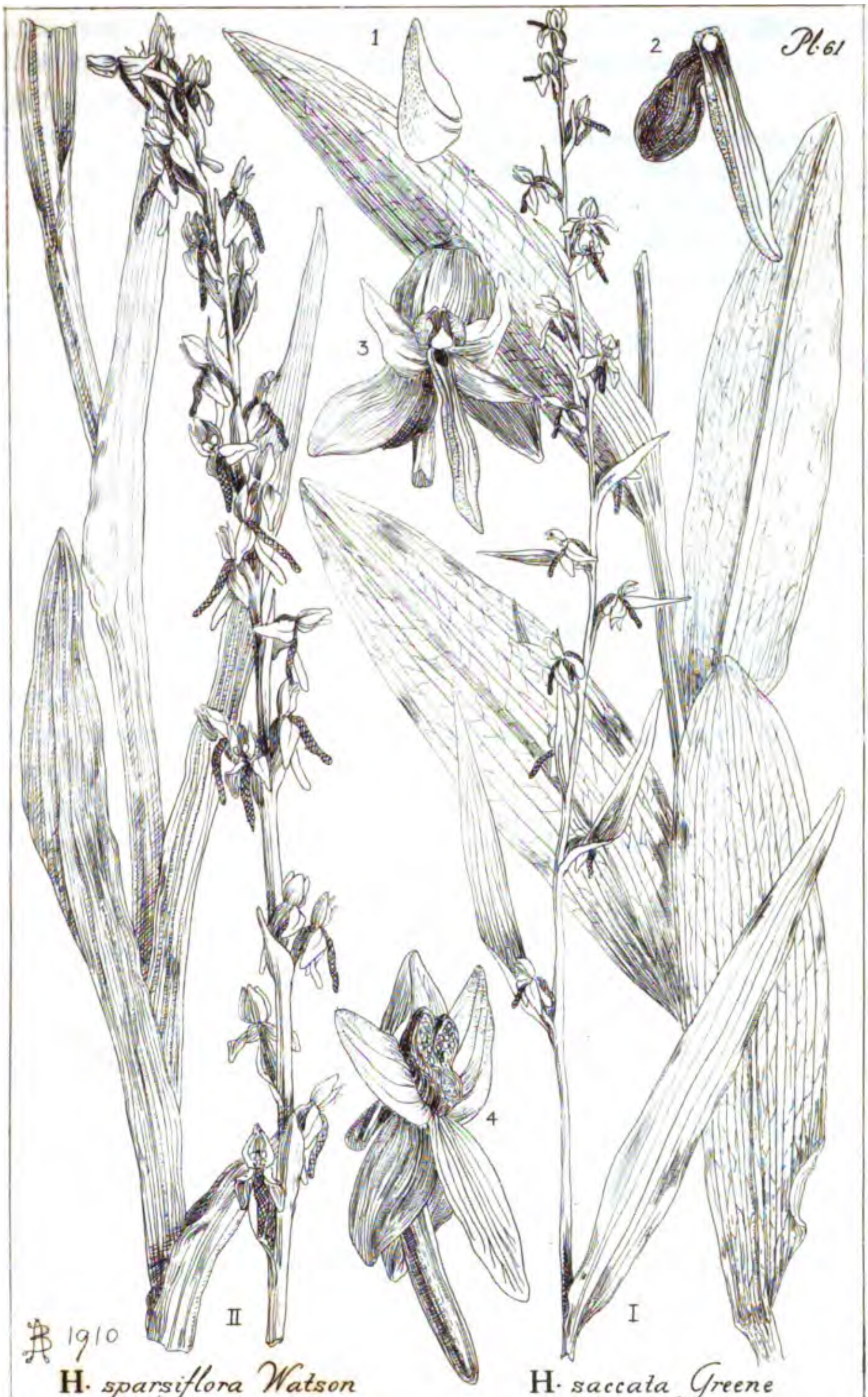
ORCHIDACEÆ

PLATE 61

I. *Habenaria saccata*. Plant, natural size, drawn from a specimen collected by W. N. Suksdorf (no. 2689), California. 1. Petal. 2. Labellum. 3. Flower. Flower and parts drawn, enlarged, with the aid of the camera lucida.

II. *Habenaria sparsiflora*. Plant, natural size, drawn from specimen collected by C. V. Piper (no. 5090), Oregon. 4. Flower drawn, enlarged, with the aid of the camera lucida.

Pl. 61



H. *sparsiflora Watson* **H.** *saccata Greene*

Yale Dist.: Chilliwack Lake, 3000 ft., June 30, July 11 and 29, 1901, *J. M. Macoun* (1).—West of Sophie Mt., July 9, 1902, *Macoun* (1).

VANCOUVER ISLAND

Rather common in low ground, July 25, 1887, *J. Macoun* (3).—Marshes, Union mines, near Comox, June 26, 1893, *Macoun* (no. 2816) (2, 3, 6). —Cadboro Bay, May 31, 1892, *Macoun* (6).—Little Aulicum River, July 15, 1887, *Macoun* (6).—Aulicum, July 23, 1887, *Macoun* (2).—Swamps, Cameron Lake, July 15, 1887, *Macoun* (6).—Camp woods, common, July 16, 1887, *Macoun* (3).

Renfrew Dist.: Moist places in the forest, June–July, 1901, *C. O. Rosendahl & C. J. Brand* (no. 97) (2, 3, 4, 6); in bogs and swamps, July 19, 1902, *Rosendahl* (no. 780)(4, 6); August 11, 1902, *Rosendahl* (no. 912 in part)(4).

ALBERTA

Emerald Lake, Yoho Valley, Rocky Mountain Park, August 26, 1904, *J. Macoun* (1).

MONTANA

Swamps, Flathead Valley, July 25, 1883, *Wm. Canby* (no. 311) (3, 16).

Gallatin Co.: Spanish Basin, 6500 ft., June 28, 1897, *P. A. Rydberg & E. A. Bessey* (no. 3894) (2, 5); July 11, 1896, *J. H. Flodman* (no. 362) (2, 4).

Madison Co.: Summit, Great Northern Railroad, July 25, 1894, *R. S. Williams* (1).

WYOMING

In shaded bogs, Iron Spring Creek, Yellowstone Park, August 2, 1899, *A. & E. Nelson* (no. 6273) (4).

COLORADO

Sawatch Range, 2500 ft., July, 1880, *T. S. Brandegee* (9).

El Paso Co.: Walton Creek, July, 1892, *Alice Eastwood* (9).—Moist soil, Cheyenne Cañon, June 19, 1896 (Biltmore Exp. no. 522 a) (5).

IDAHO, Kootenai County

Moist places, Packsaddle Peak, August 6, 1892, *Sandberg, MacDougal & Heller* (no. 861) (2, 3).—Wet ground along rills, Sept. 10, 1894 (fruit), *L. F. Henderson* (2).—Along mountain streams, July, 1887, *Sandberg* (16).

Shoshone Co.: Springy mountain slopes, summit of Stevens Peak, 1980 m., August 5, 1895, *John B. Leiberg* (no. 1478) (2).

Latah Co.: July 7, 1893, *C. V. Piper* (9).—Frequent in cañons, Bald

H. saccata

Knob, Cedar Mt., June 20, 1892, *Sandberg, MacDougal & Heller* (no. 471) (2, 3).—Cedar Mts., June, 1899, *A. D. E. Elmer* (no. 1715) (4).—On moist sandy stream banks, Moscow Hills, June 25, 1896, *Elmer* (no. 344) (2, 4).

Nez Percés Co.: About Lake Waha, alt. 2000–3500 ft., July 2, 1896, *A. A. & E. Gertrude Heller* (no. 3354) (2).

Lemhi Co.: Woods near source of Mill Creek, above Indian Reservation, 8800 ft., August 20, 1895, *Henderson* (no. 4004) (2).

Washington Co.: Seven Devils Mts., 6000 ft., August 5, 1899, *Marcus E. Jones* (no. 6603) (2, 4).

WASHINGTON

Cascade Mts., 49° N. lat., 1859, *Dr. Lyall* (3).—Park River, 1861, *Dr. Lyall* (3).—Cascade Mts., 1882, *Frank Tweedy* (no. 337) (16).—Lake Wenatchee, 610 m., August 1, 1893, *Sandberg & Leiberg* (no. 647b) (2).

Skagit Co.: Skagit Pass, August, 1892, *Lake & Hull* (no. 624) (9).

Clallam Co.: Olympic Mts., August, 1900, *A. D. E. Elmer* (no. 2549) (2, 4).

King Co.: Green River Hot Springs, July 18, 1888, *C. V. Piper* (2).—Lake Washington, June 20–July 12, 1898, *T. E. Savage, J. E. Cameron & F. E. Lenocker* (4).—Stevens Pass, 4000–6000 ft., August, 1893, *Sandberg* (5).

Kittitas Co.: Mt. Stuart, August, 1898, *Elmer* (no. 1231) (2).

Spokane Co.: Mt. Carleton, July 16, 1902, *Frank O. Kreager* (no. 189) (2, 3).

Chehalis Co.: Big Creek prairies, 2500 ft., August 11, 1897, *Frank H. Lamb* (no. 1401) (4).

Pierce Co.: Meadows, Mt. Rainier, 5500 ft., August, 1890, *E. C. Smith* (4); near Mt. Rainier, August, 1889, *Smith* (874) (3); rich meadows, 6500 ft., Mt. Rainier, August 1–15, 1895, *Piper* (no. 2094) (3).—Common in swamps, upper valley of the Nesqually, June 18, 1894, *O. D. Allen* (no. 76) (2, 3, 4, 5, 6, 7).

Pacific Co.: Ilwaco, June 22, 1904, *Piper* (no. 5001) (1).

Yakima Co.: Damp places and wet meadows, Mt. Adams, July 6, August, 1882, *W. N. Suksdorf* (3, 15, 16).

Skamania Co.: Springy places in mountain forests, July 23, 1901, *Suksdorf* (no. 2689) (1).

OREGON

1871, *E. Hall* (no. 504) (3, 4, 16).—*Howell* (2, 16).—Swamps, Simcoe Mts., July, 1880, *J. & T. J. Howell* (no. 302) (3).—Subalpine stream banks, *H. saccata*

East Oregon, 1897, *Wm. C. Cusick* (no. 1738) (2, 4, 7).—Cascades, July, 1893, *Mrs. R. M. Austin* (9).—Marsh, Cascade Mts., Hood River, June 29, 1883, *L. F. Henderson* (10).

Wasco Co.: Mt. Hood, August 6, 1881, *T. J. Howell* (2, 7).

Union Co.: In small mountain stream, July, 1878, *Cusick* (3).

Klamath Co.: Bogs, Upper Camp Spring, Crater Lake, August 16, 1896, *Elmer I. Applegate* (no. 691) (2, 3); moist slopes, Crater Lake, August 22, 1896, *M. W. Gorman* (no. 503) (2).— Near Pole Bridge, road to Crater Lake, 1730 m., August 12, 1896, *Coville & Leiberg* (no. 335) (2).

CALIFORNIA, Modoc County

Hills, in wet places, July, 1884, *Mrs. R. M. Austin* (9).—Swamps, Sugar Loaf Hill, August, 1885, *Mrs. Austin* (9).—Head-waters of Davis Creek, July, 1885, *Oliver Austin* (9).

11. H. Richardii nom. nov.

H. Richardii

Platanthera longifolia *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 80 (1845), not *Habenaria longifolia* Lindl., Gen. & Sp. Orch. 324 (1835).

"107. *P. longifolia* Nob. Fol. lanceolatis angustis; flor. viridibus: labello lineari, calcare inflato." Rich. & Gal. *loc. cit.*

The type specimen of *Platanthera longifolia* is very unsatisfactory. The lowermost leaf is about 14.5 cm. long, linear, acute. The uppermost leaf is about 9.5 cm. long. The flowers are very difficult to observe, and, unfortunately, few. Measurements of the floral segments are as follows: dorsal sepal 5 mm. long; lateral sepals 7 mm. long; petals 5 mm. long, acute. Measurements of the lip and spur can only be made from moistened material. (Plate 62.)

MEXICO, Vera Cruz

Fl. verdâtre, Pic d'Orizaba 8000, January–October, 1840, *Galeotti* (type).[1]

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[1] This collection remains unique to this day. At Paris there is a single individual 2.5 dm. high, without roots; and a good drawing by Richard. No species known to me approaches it closely, although the individual flowers resemble those of *H. sparsiflora*. (A. A. E.)

PLATE 62

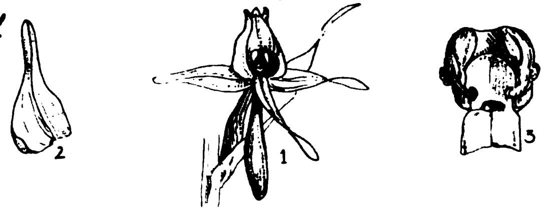
I. *Habenaria Richardii.* 1. Flower. 2. Petal. 3. Column and base of labellum. (Reproduced from a photograph of the original drawing by Richard of *Platanthera longifolia* Rich. & Gal.)

II. *Habenaria nubigena.* 1. Flower. 2. Column and base of labellum. 3. Petal. 4. Pollen-mass. (Reproduced from a photograph of the original drawing by Richard.)

III. *Habenaria volcanica.* 1. Flower. 2. Pollen-mass. (Reproduced from a photograph of the original drawing by Richard of *Gymnadenia neottioides* Rich. & Gal.)

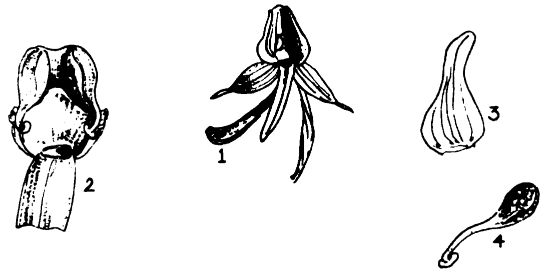
Pl. 62

I



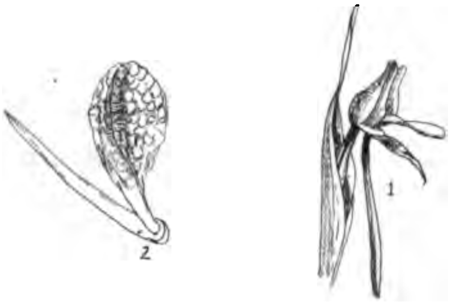
HABENARIA *Richardii nom. nov.*

II



HABENARIA *nubigena comb. nov.*

III



HABENARIA *volcanica Watson*

12. H. Ghiesbreghtiana (*Rich. & Gal.*) *Hems.*, Biol. Cent. Am. **8**: 805 (1884).

H. Ghiesbreghtiana

Platanthera Ghiesbreghtiana *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 30 (1845); *Reichb. f.*, in Linnæa 28: 381 (1856).—**P. hyperborea** VAR. **leucostachys** *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899), 943 (1901) in part.

"108. *P. Ghiesbreghtiana* Nob. Fol. lanceolatis acutis, flor. viridibus numerosis: labello lanceolato, crasso subacuto." Rich. & Gal. *loc. cit.*

Habenaria Ghiesbreghtiana is closely allied to *H. brevifolia*, and may be inseparable from it, but the material I have examined has not been sufficient to warrant a definitive conclusion. The leaves of *H. Ghiesbreghtiana* are 8.5 cm. in length on the type specimen and somewhat spreading, thus differing from the leaves of *H. brevifolia* which are rarely 7 cm. long and conspicuously appressed to the stem. The specimen collected by Conzatti, cited above, was compared with Richard's type, and agreed with it in detail save as to leafage.

MEXICO, OAXACA
Ghiesbreght (type).[1]
? CERRO DE SAN FELIPE: *Conzatti & Gonzalez* (no. 457b).

13. H. nubigena (*Rich. & Gal.*) comb. nov.

H. nubigena

Platanthera nubigena *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 29 (1845).

"106. *P. nubigena* Nob. Parvula: fol. elliptico-oblongis; flor. albido-virescentibus: labello lineari obtuso." Rich. & Gal. *loc. cit.*

The type of this, a Mexican species (*Galeotti* no. 5257), consists of a single individual 9 cm. tall, with lanceolate-triangular leaves,

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[1] There is one individual of this at Paris and a drawing of a flower and bract, a lip and column and a pollen-mass. (A. A. E.)

H. nubigena

about 3 flowers and several buds. In addition to this material there is a drawing of a flower, petal, column and lip-base, and pollinium. It appears to be distinct. The dorsal sepal is 5 mm. long, 3 mm. wide. The lateral sepals are 6 mm. long. The oblong, linear lip is 5 mm. long. (PLATE 62.)

H. sparsiflora

14. **H. sparsiflora** *Wats.*, in Proc. Am. Acad. 12: 276 (1877), Bot. Cal. 2: 134 (1880), not *Platanthera sparsiflora* Schltr., in Bull. Herb. Boiss. 7: 538 (1899)?;[1] *S. B. & W. F. Parish*, Pl. So. Cal. 7; *Macoun*, Cat. 4: 15 (1888), excl. syn.; *Rattan*, Fl. 176 (1898).—**H. Thurberi** VAR. *Wats.*, Bot. Cal. 2: 134 (1880).

Platanthera hyperborea δ leucostachys *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899).—**P. Thurberi** VAR. **Grayi** *Kränzl.*, Orch. Gen. et Sp. 1: 643 (1899) in syn.[2]

Limnorchis ensifolia *Rydb.*, in Bull. Torr. Bot. Cl. 28: 629 (1901).—**L. laxiflora** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 630 (1901), excl. *Hall* (no. 504).—**L. sparsiflora** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 631 (1901).

Habenaria aggregata *Howell*, Fl. Nw. Amer. 623 (1902).

"HABENARIA SPARSIFLORA. Stem rather slender, a foot or two high, leafy: leaves narrowly lanceolate, acutish or acute: bracts linear-lanceolate, acuminate, usually much exceeding the greenish flowers, which are few (10 to 20) and distant: perianth thin and delicate, apparently spreading: sepals 3-nerved, the lateral ones oblong or lanceolate, 2 or 3 lines long, the upper ovate and a little shorter: lip several-nerved, narrow, linear or lanceolate,

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[1] That this species, heretofore not reported south of the United States, has been found in Guatemala is extremely doubtful. Probably Schlechter's identification was based on the closely related *H. volcanica*, which is common southward, or on *H. limosa*, which extends throughout Mexico.

[2] Kränzlin (*loc. cit.*) cites *P. Thurberi* var. *Grayi* Wats. There never was such a combination. Watson says that "*Habenaria Thurberi*, var., Gray, Proc. Am. Acad. vii. 389," is *H. sparsiflora*.

H. sparsiflora

3 or 4 lines long, nearly equaling the narrow spur: anther emarginate; stalks of the pollen-masses very slender: glands orbicular: beak of stigma broadly triangular: capsule oblong, sessile, 6 lines long.—*H. Thurberi*, var., Gray, Proc. Am. Acad. vii. 389. Common in the Sierra Nevada and mountains of northern California; marked by its peculiar habit. The typical *H. Thurberi* is to be referred to *H. leucostachys*." Wats. *loc. cit.*

Habenaria sparsiflora is very closely allied to *H. saccata*. It differs from that species in its more slender spurs and larger flowers. Usually in *H. sparsiflora* the spur is subequal to the lip, and if short and stout is cylindrical rather than saccate or scrotiform.

H. aggregata surely belongs with *H. sparsiflora*. (Plate 61.)

COLORADO, Archuleta County

Piedra, 7000 ft. alt., July, 1899 (no. 265 in part) (2).

UTAH

"Southern Utah, northern Arizona," &c., 1877, *Dr. E. Palmer* (no. 460) (2, 4, 16).—Cottonwood Cañon, 6000 ft., July, 1869, *Sereno Watson* (no. 1154) (2).—Jordan Valley, 5000 ft., July, 1869, *Watson* (no. 1152) (2).

Utah Co.: Region of Lake Utah, 1875, *C. C. Parry* (no. 89) (4, 16).—American Fork Cañon, August, 1880, *M. E. Jones* (3).—Alta, August, 1880, *Jones* (2).

Piute Co.: Marysville, alt. 8000 ft., August 27, 1894, *Jones* (no. 5920) (4, 5).

Garfield Co.: Slope of Aquarius Plateau, 9000 ft., July 22, 1875, *L. F. Ward* (no. 395) (2).

NEVADA, Washoe County

Little Valley, 2000–2155 m., *C. F. Baker* (no. 3410) (1).

Esmeralda Co.: D. Davis Ranch, 7000 ft., July, 1886, *W. H. Schockley* (no. 506) (3).

NEW MEXICO, Socorro County

Along streams, Mogollon Mts., July 19, 1881, *H. H. Rusby* (no. 399) (2, 4, 10).

Grant Co.: Spring at Twin Sisters near Silver City, June 22, 1880, *E. L. Greene* (3, 16).

H. sparsiflora

ARIZONA

1883, *H. H. Rusby* (no. 449) (9).—Willow Spring, 7195 ft., July, 1874, *Dr. J. T. Rothrock* (nos. 209, 269) (2, 3, 16).

Coconino Co.: Flagstaff, July, 1891, *D. T. MacDougal* (2).—Mt. Agassiz, August 29, 1883, *Rusby* (no. 833) (2, 3, 6, 10, 16).

OREGON, Wasco County

Wet borders of Lost Lake, high cascades near Mt. Hood, August 25, 1884, *L. F. Henderson* (9).

Josephine Co.: In tussocks 1 to 5 inches in diameter, Eight-Dollar Mt., May 31, 1884, *Thos. Howell* (3); June 13, 1904, *C. V. Piper* (no. 5090) (1).—In dense tufts, in boggy rivulets near summit of Siskiyou Mts., July 31, *Wm. C. Cusick* (no. 2933 a) (1).—Upland marshes and springs near Kerbyville, May 30, 1884, *Howell* (2, 9, 16).

Curry Co. (?): Coast mountains, June 8 and 9, 1884, *Howell* (2, 3, 6) (type locality for *Limnorchis laxiflora* Rydb.).

CALIFORNIA

Foothills of the Sierra Nevada, 1865, *John Torrey* (no. 511 a) (3).—Flowers and whole plant alike pale green, Summit Camp, Sierra Nevada, July 10, 1870, *Kellogg* (9).—Near Donner Lake, 1865, *Torrey* (no. 511) (3).

Modoc Co.: Swamps, Sugar-Loaf Hill, August, 1885, *Mrs. R. M. Austin* (9).

Siskiyou Co.: By streamlets at 7000 ft. in Scott Mts., August 22, 1876, *E. L. Greene* (no. 1036) (3).—Foot of Mt. Eddy, 7500 ft., August 17, 1903, *E. B. Copeland* (no. 259) (1).—Mt. Shasta, 6000 ft., August 23, 1881, *C. G. Pringle* (3, 7); below timber-line, Mt. Shasta, August 12, 1900, *J. W. Congdon* (9).

Del Norte Co.: Gasquet, June 21–27, 1903, *Alice Eastwood* (9).—Between Gasquet and Shelley Creek, June 21–27, 1903, *Eastwood* (9).—Darlingtonia bogs, Illinois and Smith rivers, June, 1879, *V. Rattan* (3).

Shasta Co.: Lassen's Peak, 6000 ft., July 7, 1897, *M. E. Jones* (2).

Trinity Co.: Along Cañon Creek, July 2–18, 1901, *Eastwood* (9).

Plumas Co.: Mt. Dyer, July 21, 1879, *Mrs. Austin* (3, 16).

Butte Co.: Butte Creek, July, 1896, *Mrs. Austin* (4); *Mrs. C. C. Bruce* (2).

Sierra Co.: 1874, *J. G. Lemmon* (no. 679) (3, 16).

Placer Co.: Wet springy places on Truckee River, July, 1886, *C. F. Sonne* (no. 20) (9).—Summit, 1877, *H. Edwards* (9); June 8–16, 1898, *Eastwood* (9).

Lake Co.: In the "Horse Pasture" near summit of Mt. Sanhedrin, July 20, 1902, *A. A. Heller* (no. 5999 in part) (1).

H. sparsiflora

Mendocino Co.: Red Mt., 1869, *A. Kellogg & W. G. W. Harford* (no. 963) (3); swamps, Red Mts., June (1866?), *H. N. Bolander* (no. 6580) (3).

Eldorado Co.: Above "Slipping Ford," Strawberry Valley, 6500 ft., July 13, 1897, *E. Brainerd* (7); under large conifers, Strawberry Creek, 5900 ft., July 14, 1897, *Brainerd* (5).

Mariposa Co.: June 30, 1885, *J. W. Congdon* (9).—Glacier Point, Yosemite, July 5–19, 1902, *Eastwood* (9).—Big trees and Yosemite Valley, 1866, *Bolander* (no. 6251) (3, 4, 16), (type).

Fresno Co.: October, 1890, *Mrs. Rawson Peckinpah* (2).—Pine Ridge, 5000 ft., June 15–25, 1900, *Hall & Chandler* (no. 139) (2, 4).

Tulare Co.: Kern River, near lakes, July 16, 1903, *Eastwood* (9).

San Bernardino Co.: Mill Creek, San Bernardino Mts., July, 1881, July, 1882, *S. B. & W. F. Parish* (no. 947) (3, 4, 15).—Deep Creek, July, 1901, *Le Roy Abrams* (no. 2047) (4).

H. brevifolia

15. **H. brevifolia** *Greene*, in Bot. Gaz. 6:218 (1881).

Platanthera hyperborea δ leucostachys *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899) in part.—**P. brevifolia** *Kränzl.*, Orch. Gen. et Sp. 1: 639 (1899).

Limnorchis brevifolia *Rydb.*, in Bull. Torr. Bot. Cl. 28: 631 (1901).

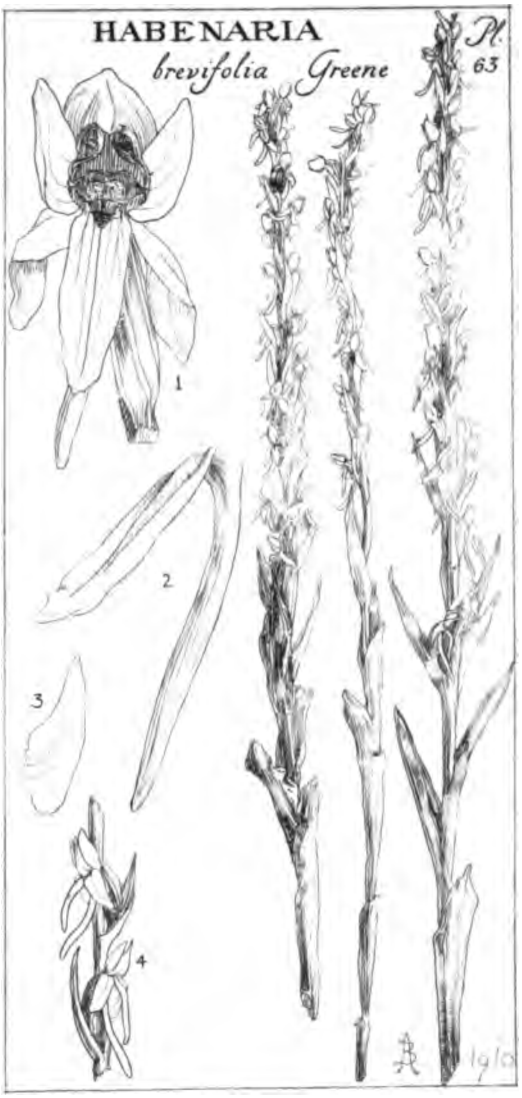
"Habenaria brevifolia.—Stem a foot or two high and stout; leaves numerous, mostly less than 2 inches long, all but the lanceolate uppermost ones loosely sheathing the stem; bracts linear-lanceolate, all but the uppermost exceeding the greenish flowers, which are numerous, in a long, rather dense spike; lateral sepals linear-oblong, 4 lines long, the upper ovate; lip linear or linear-lanceolate, entire, rather acute, nearly a half inch long, shorter than the spur; anther retuse; pedicels of the pollen masses slender; glands orbicular; capsule oblong, 6–8 lines long, sessile; root fleshy-fibrous.

"Dry southward slopes of the Pinos Altos Mountains, New

ORCHIDACEÆ

PLATE 63. *Habenaria brevifolia*

Three plants, reduced, drawn from a photograph of specimens in the herbarium of the San Francisco Academy of Sciences, collected by Edward Lee Greene in the Pinos Altos Mountains, New Mexico, July, 1880. 1. Flower. 2. Labellum and spur. 3. Petal. 4. Flowers, natural size. (2, 3 and 4, from specimens in Gray Herbarium, collected by Greene on dry ground under *Pinus ponderosa*, Pinos Altos Mountains, New Mexico, September 14, 1880, no. 369.)



HABENARIA
brevifolia Greene

Pl. 63

Mexico, in open woods of *Pinus ponderosa*, in flower September 14, 1880. *H. brevifolia*

"A striking species, in floral character most like *H. sparsiflora*, Watson, which grows by shady streamlets in the same region, but of very different habit, being nearly leafless, the foliage reduced to mere loosely sheathing bracts, their tips only somewhat leafy-spreading, and the stout stems flowering from near the ground." Greene, *loc. cit.*

NEW MEXICO

In dry ground under *Pinus ponderosa*, Pinos Altos Mts., September 14, 1880, *Edward Lee Greene* (no. 369) (3, 4, 9, 16),(type).

LINCOLN Co.: White Mts., 7000 ft., August 17, 1897, *E. O. Wooton* (2, 4, 5).

MEXICO, CHIHUAHUA

Damp soil, Sierra Madre, October, 1887, *C. G. Pringle* (no. 1374) (2, 3, 7, 16); Sierra Madre, near Colonia Garcia, 7500 ft., August 8, 1899, *C. H. Townsend & C. M. Barber* (no. 216) (2, 3, 4, 5); August 1–20, 1899, *E. W. Nelson* (no. 6201) (2).

MICHOACÁN: Mountains near Patzcuaro, October 12, 1892, *Pringle* (no. 5314) (3, 7).

FEDERAL DIST.: Eslava, Valley of Mexico, 8000 ft., September 7, 1901, *Pringle* (no. 9626) (3), a single specimen.

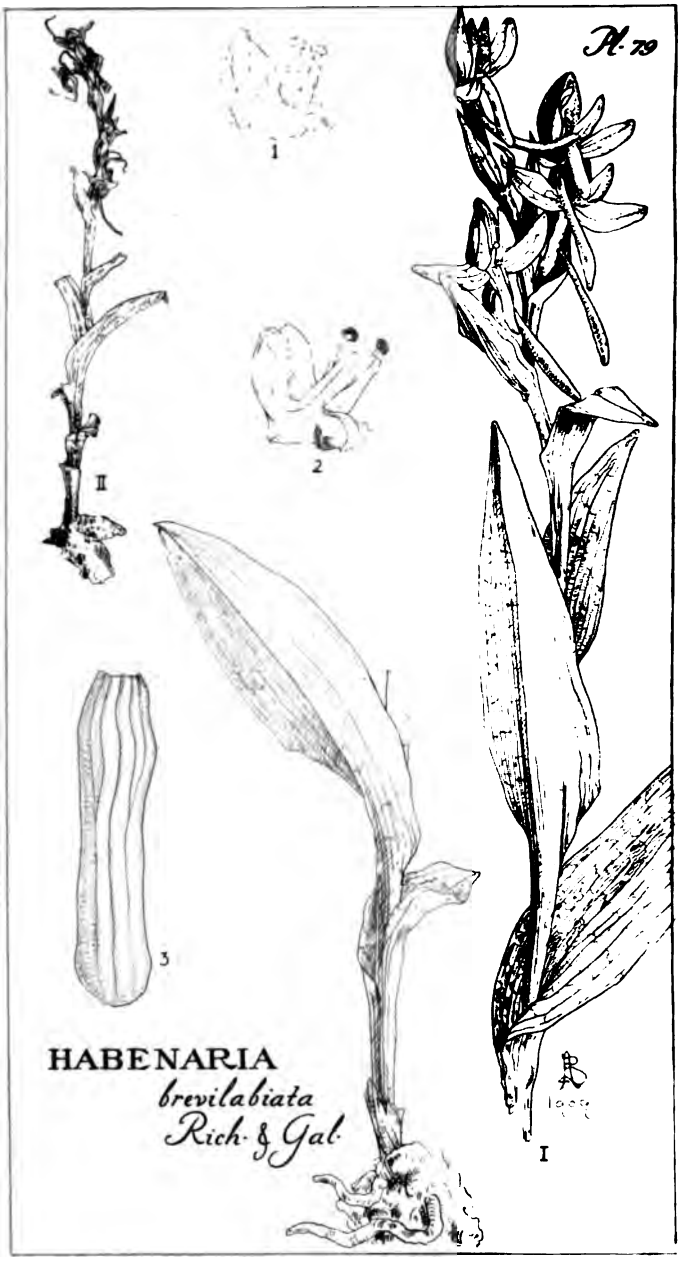
GUERRERO: Top of Sierra Madre near Chilpancingo, alt. 9000–10,200 ft., December 24, 1894, *Nelson* (no. 2194) (2).

OAXACA: Wet soil, Sierra San Felipe, 8500 ft., August 8, 1894, *Pringle* (no. 5758) (3); September 12, 1897, *C. Conzatti & V. Gonzales* (no. 458) (1).

16. **H. volcanica** (*Lindl.*) *Wats.*, in Proc. Am. Acad. 18: 159 (1883).—**H. vulcanica** (*Lindl.*) *Hems.*, Biol. Cent. Am. 3: 306 (1884). *H. volcanica*

Platanthera volcanica *Lindl.*, in Ann. Nat. Hist. 4: 381 (1840), in Benth. Pl. Hartw. 53 (March, 1840).

Gymnadenia neottioides *Rich. & Gal.*, in Ann. Sci. Nat.



HABENARIA
brevilabiata
Rich. & Gal.

of *Gymnadenia neottioides* Rich. & Gal.).—Sierra de San Felipe, 10,000 ft., September, 1894, *Charles L. Smith* (no. 804) (4).—Sierra de Clavellinas, 9000 ft., October 16–19, 1894, *Smith* (no. 802) (4).—Cerro San Felipe, 9500–11,000 ft., 1894, *E. W. Nelson* (no. 1065) (2).—Near Reyes, alt. 7500–10,400 ft., October 17, 1894, *Nelson* (no. 1733) (2).—Chiapas, *Ghiesbreght* (no. 93) (3). *H. volcanica*

This species has been reported as follows:

MEXICO

Michoacán(?): Real del Monte, *Hartweg* (type).

Vera Cruz: Peak of Orizaba, 10,000–12,000 ft., *Liebmann* (nos. 141, 235, 242, 244).

17. **H. limosa** (*Lindl.*) *Hems.*, Biol. Cent. Am. 3: 305 (1884). *H. limosa*

Platanthera limosa *Lindl.*, in Ann. Nat. Hist. 4: 381 (1840); *Kränzl.*, Orch. Gen. et Sp. 1: 646 (1899), 943 (1901).

? **Gymnadenia propinqua** *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 30 (1845).

Habenaria Thurberi *Gray*, in Proc. Am. Acad. 7: 389 (1868).—**H. leucostachys** *Wats.*, in Bot. Cal. 2: 134 (1880) in part; *Hems.*, Biol. Cent. Am. 3: 305 (1884).

Platanthera hyperborea var. **leucostachys** *Kränzl.*, Orch. Gen. et Sp. 1: 642 (1899), 943 (1901) in part.

Limnorchis Thurberi *Rydb.*, in Bull. Torr. Bot. Cl. 28: 624 (1901) in part, excl. descr. & Californian specimens cited.—**L. Arizonica** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 629 (1901).

"Platanthera (§ 1. a.) *limosa;* caule folioso, foliis ensiformibus erectis, racemo laxo multifloro, bracteis striatis acutis floribus brevioribus, petalis ovatis sepalisque obtusis, labello lineari convexo obtuso labello [calcare?] filiformi pendulo pluries breviore.—*Mexico:* In paludibus, Angangucо, juxta Asoleadero, Sept. Hartweg." Lindl. *loc. cit.*

The type of *Gymnadenia propinqua* Rich. & Gal., according

H. limosa to notes made at Paris by Eaton, consists of a single specimen in bud which is unserviceable for a definitive conclusion regarding its position in synonymy. Judging from Richard's drawing it may be conspecific with *H. limosa,* although it may be referred also to *H. volcanica* with equal surety. *H. Thurberi* is similar to *H. limosa.* The type has a linear lip. It is difficult to comprehend Dr. Rydberg's treatment of *H. Thurberi.* He has confused it with *H. dilatata* var. *leucostachys,* and described as *Limnorchis Arizonica* material which agrees beautifully with Gray's type of *H. Thurberi.*

NEW MEXICO, Socorro County

Along streams, Mogollon Mts., July 19, 1881, *H. H. Rusby* (no. 399) (2, 4); 8000 ft. alt., July 20, 1903, *O. B. Metcalfe* (no. 282) (4).

ARIZONA

Rincon Mts., 1891, *G. C. Neally* (no. 78) (2, 4), (type of *Limnorchis Arizonica* Rydb.).

Pima Co.: Rich cañons of the Santa Rita Mts., 6000–7000 ft., July 3, 1881, *C. G. Pringle* (no. 13,878) (2, 3, 4, 7, 16).

Cochise Co.: Tanner's Cañon, near Fort Huachuca, August, 1882, *J. G. Lemmon* (nos. 2884, 2885) (3).—Cold brooks and springs, Huachuca Mts., July 1, 1884, *Pringle* (2).

MEXICO

In the Sierra Madre, June 21–July 29, 1899, *E. W. Nelson* (nos. 6052, 6151, 6153) (2).

Chihuahua: Cañon parallel with Cañon de los Alamos on Rio San Miguel, June 28, 1891, *C. V. Hartman* (no. 711) (2, 3).—Near Colonia Garcia, Sierra Madre, 7500 ft., June 5, 1899, *C. H. Townsend & C. M. Barber* (no. 77) (4); August 8, 1899, *Townsend & Barber* (no. 442) (4).

Nuevo León?: Sierra Madre, forty miles south of Saltillo, August, 1880, *Dr. Edward Palmer* (3).

Sonora: Mexican Boundary Survey (no. 1423) (2).—Near spring, between Babocamori and Santa Cruz, September 22, 1851, *G. T. Thurber* (no. 925) (3, 9), (type of *H. Thurberi*); Babocamori, near Santa Cruz, 1851, *C. Wright* (no. 1900) (2, 3). Though no two labels on these five sheets are

H. limosa

precisely alike, a comparison of all, with the plants, leaves no doubt but that the specimens were collected at one time and place. All the specimens are in early fruit. Wright's are accompanied by a label on which is printed "C. Wright, Coll. N. Mex., 1851–2," but the sheet in the Gray Herbarium is annotated as above. Some sheets of this number are not annotated, so, naturally, they have been referred to New Mexico by Dr. Rydberg.

MICHOACÁN: In swamps on the Asoleadero, Angangueo, September, *Hartweg* (20), type.

OAXACA: Fl. vertes, Sierra de la Virgin, Océan Pacif., September, 1840, *Galeotti* (no. 5055) (21).

H. elegans

18. **H. elegans** *Bol.*, Fl. San Francisco 29 (1870); *Wats.*, Bot. Cal. 2: 133 (1880); *Brandegee*, in Proc. Cal. Acad. Sci. ser. 2, 1: 217 (1888); *Macoun*, Cat. 4: 17 (1888), Check-list 53 (1889); *Jepson*, in Erythea 1: 13 (1893); *Greene*, Man. Bot. Bay Reg. 306 (1894); *Rattan*, Fl. 176 (1898); *Jepson*, Fl. Mid. Cal. 131 (1901); *Howell*, Fl. Nw. Amer. 627 (1902).

Platanthera elegans *Lindl.*, Gen. & Sp. Orch. 285 (1835); *Hook.*, Fl. Bor. Am. 2: 196 (1839); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Kränzl.*, Orch. Gen. et Sp. 1: 644 (1899); *Piper & Beattie*, Fl. Palouse 49 (1901).

Gymnadenia longispica *Durand*, Pl. Pratten. in Journ. Acad. Nat. Sci. Phil. ser. 2, 3: 101 (1855).[1]

Platanthera leucostachys *Torr.*, in Emory Mex. Bound. Surv. 213 (1859) in part (as to specimens from Mokelumne, &c.).

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[1] "GYMNADENIA LONGISPICA sp. nova. (specimen cui folia radicalia desunt.) Scapo gracili erecto, fere pedali; foliis 4 infra spicam, parvulis, bracteiformibus, ovato-lanceolatis; spicâ circiter 50-florâ, gradatim ad apicem gracilescenti, 7″ longâ, bracteis lanceolatis, ovaria æquantibus; floribus minimis, albis? in sicco fuscantibus; corollis cernuis, sepalis subæquantibus, labio integro, calcare tenui, clavato, ovario longiori.

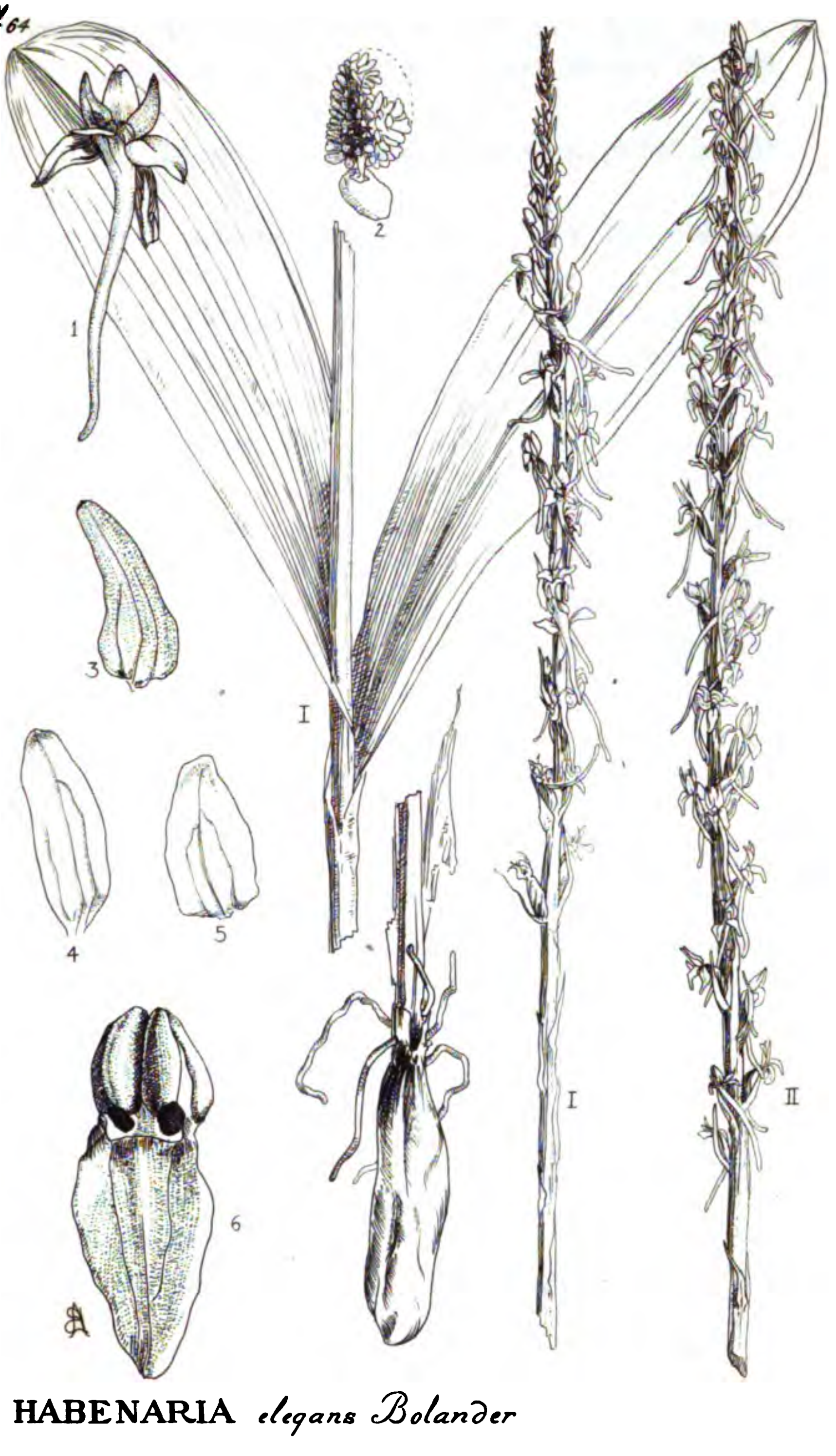
"The spike is very long, tapering, with at least fifty flowers. Sepals and petals almost equal, lip entire, spur longer than the germ, filiform, clubshape, with a much longer spike than *Spiranthes bracteosa* of Lindl. in Bot. Reg. t. 1934, to which *Gymnadenia longispica* has a great resemblance. The inflorescence seems spirally twisted round the scape." Durand, *loc. cit.*

PLATE 64. *Habenaria elegans*

I. Plant, natural size, drawn from a living specimen.

II. Inflorescence from another plant. 1. Flower. 2. Pollen-mass. 3. Petal. 4. Lateral sepal. 5. Upper sepal. 6. Labellum and column.—Parts drawn, enlarged, with the aid of the camera lucida.

Pl. 64



HABENARIA *elegans Bolander*

H. elegans

Habenaria Michaeli *Greene*, in Bull. Cal. Acad. Sci. 1: 281 (1885), Man. Bot. Bay Reg. 306 (1894); *Rattan*, Fl. 177 (1898); *Jepson*, Fl. Mid. Cal. 181 (1901).

Platanthera Menziesii *Kränzl.*, Orch. Gen. et Sp. 1: 630 (1899), not *Lindl.*

Montolivæa elegans *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 106 (1900), not *Reichb. f.*

Piperia elegans *Rydb.*, in Bull. Torr. Bot. Cl. 28: 270, 638 (1901); *Piper*, Fl. Wash., in Contr. Nat. Herb. 11: 209 (1906). —**P. elongata** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 270 (1901).— **P. lancifolia** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 637 (1901).— **P. leptopetala** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 637 (1901); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 209 (1906).—**P. multiflora** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 638 (1901); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 209 (1906).—**P. longispica** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 639 (1901).—**P. Michaeli** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 640 (1901); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 209 (1906).

Habenaria multiflora *Blankinship*, in Mont. Agr. Coll. Sci. Stud. 1: 45 (1905).

"8. Platanthera elegans.

"P. foliis binis oblongo-lanceolatis, caule squamis parvis ramentaceis, spicâ longâ densâ cylindraceâ, bracteis lineari-subulatis florum longitudine, sepalis campanulatis acuminatis obtusis, petalis labelloque carnosis ovato linearibus obtusis subæqualibus, calcare filiformi arcuato ovario longiore.

"Hab. in *America boreali occidentali*, *Douglas*. (*hab. s. sp. comm. Soc. Hort.*)

"Tubercula indivisa. Caulis sesquipedalis. Flores parvi. Glandulæ polliniorum maximæ." Lindl. *loc. cit.*

H. elegans VAR. **maritima** (*Greene*) comb. nov.—**H. ma-**

H. elegans ritima *Greene*, in Pittonia 2: 298 (1892), Man. Bot. Bay Reg. 806 (1894); *Kränzl.*, Orch. Gen. et Sp. 1: 467 (1898); *Jepson*, Fl. Mid. Cal. 132 (1901).

Piperia maritima *Rydb.*, in Bull. Torr. Bot. Cl. 28: 641 (1901).

"HABENARIA MARITIMA. Very robust, only 6 to 16 inches high, at flowering time destitute of foliage, but the upper part of the stem bearing many lanceolate-subulate appressed and more or less imbricated green bracts ½ inch long or more: spike 1½ to 3 inches long, 1 inch thick, the flowers closely crowded, white, heavily honey-scented: sepals oblong, obtuse, 1½ lines long, white, with a narrow and delicate deep-green midvein; petals not quite equalling the sepals, oblong-lanceolate, the upper 2 plane, deep-green at base and well up the middle, otherwise white, the lip pure white even to the prominently elevated and broad midvein: spur slender, longer than the ovary.

"On dry hills near the sea at Point Lobos, near San Francisco, flowering from August to October; leaves probably appearing in early spring and soon dying. Species apparently referred to *H. leucostachys* in the State Survey Botany, but most distinct." Greene, *loc. cit.*

H. elegans var. *maritima* differs from the type in its congested habit and more nearly white flowers. After an examination of numerous specimens I failed to find any structural differences which in my judgment warranted the maintenance of *H. maritima* as a distinct species. One can find a full series of specimens in one region connecting the variety with *H. Michaeli*, *Piperia multiflora* and the type. All these forms appear to be conditions of one species. The variety is found only under the influence of salt air of the littoral of California from San Francisco to Monterey County. Bolander's specimen, numbered 2490, in the Gray Herbarium, consists of a slender form of *H. elegans* and a fairly typical plant of *H. Michaeli*, *H. elegans* while his number 2429, from the same locality, is a transitional form between *H. maritima* and *H. multiflora*. Hartweg's no. 1976 is very similar to *H. Michaeli*. As the transition from one of these forms to the other is so complete, and as all often grow together, it has been impossible to distinguish centres of variation; therefore no attempt to do so has been made in the following list of localities.

BRITISH COLUMBIA

Boggy places near Frazer River, August, 1883, *Fletcher* (6).

Yale Dist.: Rich woods, Sicamous, July 8, 1889, *J. Macoun* (6).

Queen Charlotte Isls.: Long Arm, Skiddegate, July 27, 1897, *Dr. C. F. Newcombe* (6).

Vancouver Isl.: Oregon Boundary Commission, 1858–9, *Dr. Lyall* (3).—Rocky bank of Prospect Lake, July 20, 1880, *Dr. Engelmann* (4).—Horne Lake, July 27, 1887, *Macoun* (2, 6).

Victoria Co.: Cold, mossy woods on hillsides, Victoria, August, 1883, *Fletcher* (3, 6).—Beacon Hill, Victoria, August 10, 1893, *Macoun* (no. 2821) (4, 6).—Sooke road near Victoria, August 5, 1893, *Macoun* (no. 2819) (2, 6, 9).—Deep woods near Sooke Lake, Angle, *M. A. Barber* (no. 173) (3).

MONTANA, Flathead County

Columbia Falls, August 18, 1894, *R. S. Williams* (no. 1034) (4).—September 1, 1896, *Williams* (no. 1034) (2).—Woods, McDonald's Peak, Mission Range, alt. 5000 ft., July 19, 1883, *Wm. M. Canby* (no. 307) (3, 16).—Woods, north of Flathead Lake, July 25, 1883, *Canby* (no. 307) (6).

IDAHO, Kootenai County

Woods on St. Joseph River, Wiessner's Peak, 1800 m. alt., July 7, 1892, *Sandberg, MacDougal & Heller* (no. 584) (2, 3).—Priest River Forest Reserve, 700 m., August 9, 1897, *John B. Leiberg* (no. 176) (5).—Lower Priest River, August 9, 1897 (no. 2876) (2); copses, July, 1887, *J. H. Sandberg* (16); July, 1892, *Sandberg* (4).

Shoshone Co.: Shady woods, valley of north fork of Cœur d'Alene River, 950 m., August 13, 1895, *Leiberg* (no. 1527) (2).

Latah Co.: Very dry fir woods, Moscow Mts., September 10, 1894, *L. F.*

H. elegans *Henderson* (2, 14).—Cedar Mts., June, 1899, *A. D. E. Elmer* (no. 1558) (7).

Nez Percés Co.: Near Forest, 3500 ft., July 16, 1896, *A. A. & E. G. Heller* (no. 3436) (2).

Washington Co.: Seven Devils Mts., 6000 ft., September 9, 1899, *Marcus E. Jones* (no. 6604) (4).

WASHINGTON

1899, *G. R. Vasey* (no. 78) (2).—Yakima Region, 1882, Transcontinental Survey, *T. S. Brandegee* (no. 475) (4, 16).—Near Lake Roothaan, September, 1860, Oregon Boundary Commission, *Dr. Lyall* (3).—Dry, grassy, slopes, 3000–3500 ft., Twenty-five Mile Creek, Washington Forest Reserve, August 9, 1897, *M. W. Gorman* (no. 570 in part) (2).—Nisqually Trail, August 17, 1889, *E. C. Smith* (4).

Stevens Co.: Calispell Valley, August 8, 1902, *Frank O. Kreager* (no. 624) (2); August 10, *Kreager* (no. 624) (3).

Okanogon Co. (?): Lake Wenatchee, 610 m., August 1, 1893, *Sandberg & Leiberg* (no. 647a) (2).

Kittitas Co.: Mt. Stuart, August, 1898, *A. D. E. Elmer* (no. 1236) (2).

King Co.: Seattle, June 26, 1889, *Smith* (4).

Kitsap Co.: August 3, 1889, *C. V. Piper* (no. 1081) (11).

Yakima Co.: Near Mt. Adams, 1883, *L. F. Henderson* (nos. 67, 68) (3).—Simcoe, July, 1880, *Joseph & Thos. J. Howell* (no. 353) (3).

Wallawalla Co.: Blue Mts., August 2, 1896, *Piper* (3).

Klickitat Co.: Open woods, July 29 and August, 1885, *W. N. Suksdorf* (2, 4, 5, 6, 7, 9).—Flowers greenish, near Husum Post Office, July, 1905, *Suksdorf* (1).—Lower Cascade Mts., near Falcon Prairie, August 19, 1882, *Henderson* (10).

OREGON

Columbia woods, *Nuttall* (3) (*H. falcata* in hb.).—1871, *E. Hall* (no. 506) (3, 4, 16).—Drain on Southern Oregon Railroad, August 9, 1880, *Geo. Engelmann* (4).—Grave Creek Hills, June 30, 1887, *Thos. Howell* (no. 1267) (2, 4).—Rocky places, June, 1881, *Howell* (9).

Wasco Co.: Under oaks and pines, July 14, 1896, *L. F. Henderson* (5, 14).

Yamhill Co.: Open woods, North Yamhill, July 8, 1882, *Howell* (2).

Jackson Co.: Wimer, July 29, 1892, *E. W. Hammond* (no. 364) (9).

Josephine Co.: Grant's Pass, July 27–28, 1903, *Alice Eastwood* (9).—Trail to Happy Camp, July 27–28, 1903, *Eastwood* (9).—Williams Creek, June 10, *Mrs. H. L. Durden* (9).

CALIFORNIA

1872, *Miss Mary J. Bancroft* (16).—*H. N. Bolander* (3).—*Hartweg* (no. 1976) (3, 19, 21).[1]—1868–9, *Kellogg & Harford* (no. 959) (3).—Under pines, Balenas Bay, *Brewer* (no. 2429) (3); under oaks, 1863, *Bolander* (no. 2490) (3).—Santa Lucia Mts., 1885, *T. S. Brandegee* (9).

Southern California: 1876, *C. C. Parry & J. G. Lemmon* (no. 384) (3). —On steep, dry mountain slopes under pines, San Bernardino Mts., 4500 ft. alt., August, 1884, *S. B. & W. F. Parish* (no. 1699) (3, 8, 15).

Siskiyou Co.: Mt. Eddy, 4500 ft., August 19, 1903, *E. B. Copeland* (no. 297 b) (1).—Dry woods near Yreka, May 23, 1876, *E. L. Greene* (no. 804) (3).

Shasta Co.: Fir woods, mountains about the head-waters of the Sacramento River, 5000 ft., August 14, 1881, *C. G. Pringle* (7).

Plumas Co.: 1875, *Mrs. Austin* (16).

Mendocino Co.: July, 1895, *Miss K. E. Cole* (9).—Mill Creek, June 23, 1901, *Alice Eastwood* (9).—Red Mt., August 4, 1902, *Eastwood* (9).

Lake Co.: Foothills south of Mt. Sanhedrin, midway between Potter Valley and Hullville, July 15, 1902, *A. A. Heller* (1).

Placer Co.: Dutch Flat, July, 1900, *Cole* (9).—Applegate, June, 1900, *Cole* (9).

Eldorado Co.: Pyramid Peak, 1903, *Mrs. F. M. Meigs* (9).

Amador Co.: June 13, 1900, *J. C. Hawthorne* (no. 46) (9).—Agricultural Station, 2000 ft., June, 1893, *Geo. Hansen* (no. 42) (4).—Antelope, 4200 ft., July 28, 1896, *Hansen* (no. 1864) (2, 4).

Sonoma Co.: Cazadero, July 4–14, 1904, *Gwendolan Newell* (9).—Near Mark West Springs, June 28, 1902, *Heller* (1).

Marin Co.: San Rafael, October, 1878, *Moore & Kellogg* (9).—Laguintas, August, 1894, *Eastwood* (9).—Rodeo Lagoon, September, 1902, *Eastwood* (9).—Sausalito, July, 1896, *Eastwood* (9).—Vision Hill, Tomales Bay, September 1, 1900, *Eastwood* (9).—Mt. Tamalpias, May, 1900, *Eastwood* (9); July 14, 1894, *Eastwood* (9); July 11, *Mrs. Brandegee* (2); July 21, *Mrs. Brandegee* (9); July 17, 1898, *Eastwood* (9).—Mill Valley, August 2, 1896, *Eastwood* (9).

San Francisco Co.: September 19, 1892, *Michener & Bioletti* (4).—Land's End, August, 1900, *Eastwood* (9); September, 1895, *Eastwood* (2, 3, 9);

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[1] Hartweg no. 1976, in the Muséum d'Histoire Naturelle de Paris, is very near the *Michaeli* form, having prominent squarrose bracts, but it is less stout. (A. A. E.)

H. elegans August 2, 1897, *Mrs. Brandegee* (3, 9).—Bluffs along the Golden Gate, September, 1895, *Eastwood* (3).—Point Lobos, March 25, 1893, *Michener & Bioletti* (4).

Alameda Co.: Dry hills, Oakland, July and August, *Brewer* (no. 2431) (3).

San Mateo Co.: Crystal Springs near San Mateo, 1872, *A. Gray* (3).

Santa Clara Co.: Near San José, June, 1879, *Mrs. A. E. Bush* (3).—Foothills west of Los Gatos, July 1, 1904, *Heller* (1).—Santa Cruz Mts., near Los Gatos, October, 1900, *Mrs. H. N. Wright* (9).

Santa Cruz Co.: Santa Cruz, June 24, 1881, *M. E. Jones* (2).—Santa Cruz Mts., July 24, 1882, *C. G. Pringle* (7).—Glenwood, July, 1900, *Horace Davies* (9).—Mountains near Santa Cruz, *Bolander* (3).

Mariposa Co.: Yosemite Valley, 1866, *Bolander* (no. 6252 in part) (3); July 5–19, 1902, *Eastwood* (9).—Near Yosemite, 1875, *John Muir* (4). —Mariposa, June 9, 1901, *J. W. Congdon* (9).—Grove of *Sequoia gigantea*, 1865, *J. Torrey* (no. 512) (3).

Fresno Co.: Sequoia Mills, July 19, 1892, *T. S. Brandegee* (9).—Dunlap, July 15, 1893, *Eastwood* (9).

Tulare Co.: Kaweah River Valley, July 28, 1891, *Coville & Funston* (no. 1333) (2).—Three Rivers, May, 1894, *Eastwood* (9).

Monterey Co.: Pacific Grove in pine woods, August 27, 1903, *Heller* (no. 7197) (1, 2, 3, 9); August, 1900, *Dr. Wilson* (9).—July 13, 1905, *Chas. Piper Smith* (no. 1028) (1); August 19, 1905, *Smith* (nos. 1099, 1100) (1). —Monterey, *Miss E. Cannon* (9); June 1–15, 1903, *Newell* (9).—In the woods, Rose Valley, August, 1900, *Wm. Barber* (9).—Pacific Valley, May, 1898, *R. A. Plaskett* (9).—Santa Lucia Mts., July 6, 1898, *Plaskett* (no. 167) (2, 5); July 6, 1898, *Plaskett* (no. 164) (9).—Point Sur, July, 1888, *Brandegee* (3, 9).

San Luis Obispo Co.: San Simeon, June, 1887, *T. S. Brandegee* (9); June, 1884, *G. W. Michael* (9) (*H. Michaeli*); 1880, *Michael* (16).

Santa Barbara Co.: Santa Cruz Isl., July and August, 1886, *Greene* (9). —Santa Rosa Isl., June, 1880, *Brandegee* (9).—Santa Inez Mts., near Santa Barbara, 1888, *Brandegee* (9).

Los Angeles Co.: Under bushes, foothills of Sierra Santa Monica, June, 1891, *H. E. Hasse* (2).—Wooded volcanic region under Adenostoma, Avalon, Santa Catalina Isl., June, 1897, *Blanche Trask* (4, 9).

San Diego Co.: San Jacinto, June or July, 1880, *S. B. & W. F. Parish*, (no. 669) (3, 15).—Cucamonga Mts., July or August, 1881, *S. B. & W. F.*

H. elegans

Parish (no. 1157) (3, 16), August, 1881 (no. 1157) (16).—Cuyamaca Mts., July, 1889, *C. R. Orcutt* (2, 3, 4) (*H. Orcuttii*, J. N. R[ose] in hb. Gray).—Talley's, 1875, *Dr. Edward Palmer* (no. 373) (3).—Mountains near Potrero, June 20, 1906, *Orcutt* (1).

H. unalascensis

19. **H. unalascensis** (*Spreng.*) *Wats.*, in Proc. Am. Acad. 12: 277 (1877), Bot. Cal. 2:133 (1880); *Coulter*, Rocky Mt. Bot. 342 (1885); *Macoun*, Cat. 4: 17 (1888); *Britton & Vail*, in Bull. Herb. Boiss. 3: 203 (1895); *Rattan*, Fl. 176 (1898); *Kearney*, in Bail. Cycl. Am. Hort. 2: 708 (1900); *Howell*, Fl. Nw. Amer. 628 (1902).

Spiranthes unalascensis *Spreng.*, Syst. Veg. 3:708 (1826).

Habenaria Schischmareffiana *Cham.*, in Linnæa 3: 82 (1828).

Platanthera Schischmareffiana *Lindl.*, Gen. & Sp. Orch. 286 (1835); *Steud.*, Nomencl. ed. 2, 2:352 (1841); *Ledeb.*, Fl. Ross. 70 (1853).

Herminium unalaschcense *Reichb. f.*, Orch. Eur. 107, t. 65 (417)(1851); *Kränzl.*, Orch. Gen. et Sp. 1: 931 (1901). (See Lindl. in Journ. Linn. Soc. 1: 171.)

Platanthera fœtida *Geyer*, ex Hook. Journ. Bot. 7: 376 (1855); *Kränzl.*, Orch. Gen. et Sp. 1: 640 (1899); *Piper & Beattie*, Flora Palouse 49 (1901).

Habenaria fœtida *Wats.*, Bot. King 341 (1871).—**H. Cooperi** *Wats.*, in Proc. Am. Acad. 12: 276 (1877), Bot. Cal. 2: 135 (1880); *Orcutt*, Fl. S. & Lower Cal. 10 (1885); *Rattan*, Fl. 177 (1898).

Herminium congestum *Hook. f.*, Fl. Brit. Ind. 6: 130 (1890) in part; *King & Pantl.*, Orch. Sik.-Him. 335, t. 440 (1898) in part, not *Lindl.; Kränzl.*, Orch. Gen. et Sp. 1: 930 (1901).

H. unalascensis

Neottia macrophylla *Hook. f.*, Fl. Brit. Ind. 6: 180 (1890) in part.

Spiranthes macrophylla *Hook. f.*, Fl. Brit. Ind. 6: 180 (1890) in part; *Kränzl.*, Orch. Gen. et Sp. 1: 681 (1899) as syn., not *Spreng.*

Platanthera unalaschcensis *Kurtz*, in Engl. Bot. Jahrb. 19: 408 (1895); *Kränzl.*, Orch. Gen. et Sp. 1: 681 (1899).

Montolivæa unalaschensis *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 107 (1900).

Piperia unalaschensis *Rydb.*, in Bull. Torr. Bot. Cl. 28: 270, 685 (1901), Fl. Col. 88 (1906); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 208 (1906).—**P. Cooperi** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 686 (1901).—**P. lancifolia** *Rydb.*, in Bull. Torr. Bot. Cl. 28: 687 (1901).

"*unalascensis** 8. Sp. labello oblongo acutiusculo convexo discolore integerrimo sepalis patulis obtusis breviori, spica glabra, scapo aphyllo, foliis radicalibus binis oblongis obtusis. *Ins. Aleut.*" Spreng. *loc. cit.*

The most conspicuous difference between *Habenaria unalascensis* and *H. elegans* is the comparative lengths of the spurs and lips. In *H. elegans* the spurs are usually long and slender and as a rule conspicuously longer than the lips. In *H. unalascensis*, on the other hand, the spurs are shorter than the lips.

The foliage of this species is very variable. Usually there are no leaves at the flowering season.

Habenaria Cooperi appears to be a luxuriant form of *H. unalascensis*. The type specimen in the Gray Herbarium is in a poor state of preservation, but the flowers which remain on the plant are sufficient to make comparisons possible. The labellum is broader than usual, and the scape is very stout, yet these characters are not sufficient to warrant specific distinction when attention is given to the normal variation of *H. unalascensis*.

H. unalascensis

QUEBEC

Mossy woods, Jupiter River, Anticosti Isl., August 20, 1883, *J. Macoun* (3); boggy places, Jupiter River, August 20, *Macoun* (16); open gravelly woods, August 20, *Macoun* (6).

ONTARIO

In bogs and swamps, Fishing Islands, Lake Huron, July 31, 1874, *J. Macoun* (6).—Lake Superior, June, 1860, *Wm. Boott* (3).

ALBERTA

Crow Nest Pass, lat. 49° 30′, August, 1897, *J. Macoun* (3); mountain slopes, Crow Nest Pass, 6500 ft., July 31, 1897, *Macoun* (6).—Along the base of Ship Mts., Waterton Lake, July 28, 1895, *Macoun* (6).—On sand or gravel, Bow River Pass, September 14, 1879, *Macoun* (no. 211) (3, 6).

BRITISH COLUMBIA

Gravelly soil, Prospect Creek, July 18, 1888, *Dr. G. Dawson* (6).—MacLeod Lake, July 16, 1875, *Dawson* (3).—In boggy woods, vicinity of MacLeod Lake, July 14, 1879, *J. Macoun* (6).—West of Sophie Mt., International Boundary, between Kettle and Columbia Rivers, 4500 ft., July 11, 1902, *J. M. Macoun* (1).

YALE DIST.: Swampy woods, Batanie, near Spence's Bridge, July 6, 1890, *Dawson* (6).—Head-waters of Fraser River, July 21, 1898, *W. Spreadborough* (6).

VANCOUVER ISL.: Mt. Finlayson, June 28, 1887, *J. Macoun* (2).

ESQUIMALT DIST.: Gravelly banks, Goldstream, July 5, 1887, *Macoun* (6).

VICTORIA DIST.: Vicinity of Victoria, July 22, 1893, *Macoun* (2, 3, 6).

ALASKA

Unalaska, *Chamisso* in itin. (3) (*H. Schischmareffiana*).—Bernhardi Hb. (4).

MONTANA

Belt Mts., July 30, 1886, *R. S. Williams* (no. 521) (2).—Woods, headwaters of Jocko River, July 15, 1883, *Wm. M. Canby* (no. 308) (2, 7, 16).—Jack Creek Cañon, 7000 ft., July 15, 1897, *Rydberg & Bessey* (no. 3889) (2, 3, 5, 6).—Sixteen-Mile Creek, alt. 5000–6000 ft., July 12, 1883, *F. Lamson-Scribner* (no. 264) (16).—Foothills, Mission Range, July 19, 1883, *Canby* (no. 308) (16).

FLATHEAD CO.: Mountain near Columbia Falls, August 18, 1894, *Williams* (no. 521) (5).

H. unalascensis

MADISON Co.: Spanish Basin, Madison Range, 6000 ft., July 10, 1896, *J. H. Flodman* (no. 357) (2).

GALLATIN Co.: Wooded hillside, Mystic Lake, Bozeman, August 1, 1898, *J. W. Blankinship* (1).

WYOMING, UINTA COUNTY

Woods, Yellowstone Park, August, 1884, *Frank Tweedy* (no. 10) (2, 16). —In loose, loamy soil among the spruce and pines, Mammoth Hot Springs, July 21, 1899, *Aven & Elias Nelson* (no. 6033) (1, 2, 3, 4, 5, 9).

UTAH, SUMMIT COUNTY

Parley's Park, 8000 ft., July, 1869, *Sereno Watson*, King Exp. (no. 1155) (2, 3).

IDAHO

Mountains, July, 1892, *A. Isabel Mulford* (3, 4, 5).

SHOSHONE Co.: Dry ground amongst conifers, St. Mary's River, August 5, 1894, *L. F. Henderson* (2).

LATAH Co.: Meadows near Viola, July 26, 1892, *Sandberg, MacDougal & Heller* (no. 1039) (2, 3).

NEZ PERCÉS Co.: About Forest, 3500 ft., July 14, 1896, *A. A. & E. G. Heller* (no. 3429) (2, 4).

LEMHI Co.: Carmen Creek woods, near Freeman Mine, near Salmon, 6800 ft., August 27, 1895, *L. F. Henderson* (no. 4005) (2).

FREMONT Co.: Teton Cañon, July 23, 1872, *John M. Coulter*, Hayden Exp. (2, 16).

WASHINGTON

1889, *Geo. R. Vasey* (nos. 79, 375) (2).—Dry ground among oaks and pines, Eagle Creek and Cascade Mts., June 11–August 17, 1882, *L. F. Henderson* (no. 940) (9).—Dry grassy slopes 3000–3500 ft., Twenty-five Mile Creek, Washington Forest Reserve, August 9, 1897, *M. W. Gorman* (no. 570 in part) (2).—Cascade Mts., 1882, *Brandegee* (no. 481) (4, 6); *Tweedy* (no. 386) (16).—Cascade Mts., 49° N. lat., 1859, *Dr. Lyall* (3).—West Kootenay, 1861, *Dr. Lyall* (3).

OKANOGAN Co.: Nason Creek, 650 m., July 30, 1893, *Sandberg & Leiberg* (no. 617) (2).—Damp land along Twisp River, July 19, 1896, *Kirk Whited* (2).

CLALLAM Co.: Olympic Mts., August, 1900, *A. D. E. Elmer* (no. 2552) (2, 4).

KING Co.: Seattle, May 21, 1889, *E. C. Smith* (4).

H. unalascensis

Kittitas Co.: Slopes of Mt. Stuart, 1400 m., July 24, 1893, *Sandberg & Leiberg* (no. 568) (2).

Pierce Co.: Mt. Rainier, *O. D. Allen* (1, 3).

Wallawalla Co.: In woods, Blue Mts., July 15, 1896, *C. V. Piper* (1, 3); July 17, 1897, *Robert M. Horner* (no. 468) (2).

Skamania Co.: Grassy ground in open pine forests, July 24–September 23, 1901, *W. N. Suksdorf* (no. 2690) (1).

Klickitat Co.: Woods, June, 1881, *W. N. Suksdorf* (2, 10, 16).—Falcon Valley, July, 1905, *Suksdorf* (1).

OREGON

Geyer (no. 584) (3).—Columbia woods, *Nuttall* (*H. denudata* Nutt. in Brit. Mus.).—Dry soil, 4000 ft. alt., July, 1882, *W. C. Cusick* (no. 204) (16). —Rocky places, June, 1880, *Thos. J. Howell* (4, 16).—June, 1877, *Howell* (7).—June, 1881, *Howell* (9).—Dry mountains, shade, 4000 ft., July 28, *Cusick* (no. 2062) (3); *Cusick* (no. 2060) (2, 4).—1897, *E. P. Sheldon* (no. 8659) (2).—1871, *E. Hall* (no. 507) (3, 16).—Cascades, July, 1893, *Mrs. R. M. Austin* (no. 199) (9).—1873, *Rev. R. D. Herius* (3).

Clackamas Co.: Under oaks and firs, Eagle Creek, June 11, 1882, *L. F. Henderson* (15).

Wasco Co.: Dry hills, under oaks, Hood River, June 23, 1896, *Henderson* (5, 14).

Union Co.: June, July, 1876, *Cusick* (no. 204) (4).

Lane Co.: Moist cliff, McKinzie River, between Gate Creek and Blue River, July 15, 1903, *M. W. Gorman* (no. 1642) (2).

Douglas Co.: Woods, Calapooia Valley, 2000–3000 ft., July 18, 1899, *M. A. Barber* (137) (3).

Josephine Co.: Trail to Happy Camp, June 27–28, 1903, *Alice Eastwood* (9).

CALIFORNIA, Siskiyou County

Foot of Mt. Eddy, 4500 ft., August 19, 1893, *Edwin B. Copeland* (no. 297b) (1); August 17, 1903, *Copeland* (no. 259) (1).—Mt. Shasta and vicinity, July 13–27, 1892, *Dr. Edward Palmer* (no. 2569) (2).—Dry woods near Yreka, May 23, 1876, *E. L. Greene* (no. 804) (3).

Del Norte Co.: Gasquet, June 23, 1903, *Alice Eastwood* (9).

Humboldt Co.: Hupa Indian Reservation, 1000 ft., June, 1901, *Harley P. Chandler* (no. 1385) (2, 3, 4, 5, 9).

Trinity Co.: Cañon Creek, July 2–18, 1901, *Eastwood* (9).

H. unalascensis

Shasta Co.: Mountains about head-waters of the Sacramento River, 4000 ft., August 14, 1881, *C. G. Pringle* (no. 45) (3).

Lassen Co.: Butte Creek, July, 1896, *Mrs. R. M. Austin* (no. 18) (4).—Susanville, July 12, 1892, *T. S. Brandegee* (9).

Plumas Co.: 1877, *Mrs. Austin* (6).—Prattsville, July 14, 1892, *Brandegee* (9).

Mendocino Co.: Redwoods, *Bolander* (with no. 4706) (3).

Lake Co.: Snow Mt., *Mrs. Brandegee* (9).—Foothills of Mt. Sanhedrin, midway between Potter Valley and Hullville, July 25, 1902, *A. A. Heller* (1).

Sierra Co.: 1874, *J. G. Lemmon* (3, 4, 16).

Eldorado Co.: Trail to Snowy Falls, 6200 ft., July 13, 1897, *Ezra Brainerd* (5).—Fallen Leaf Lake, June 28, 1900, *Wm. W. Price* (9).—In shade of large conifers, slope of Strawberry Creek, 5900 ft., July 14, 1897, *Brainerd* (7).

Amador Co.: Deer Creek, 4000 ft., July, 1893, *Geo. Hansen* (no. 250) (4).

Sonoma Co. (?): Under pines, above Sonoma Pass, July, 1860–62, *W. H. Brewer* (no. 1933) (3).

Mariposa Co.: Wawona, July 5–19, 1902, *Eastwood* (9).—Near Sherlock's (?), May 15, 1900, *J. W. Congdon* (9).—Footman Mt., June, 1885, *Congdon* (9).—1881, *C. C. Parry* (no. 324) (3).—Yosemite Valley, 1866, *H. N. Bolander* (no. 6252 in part) (3).

Santa Cruz Co.: Mountains near Santa Cruz, June, 1860, *Bolander* (no. 53) (3, 9).

Fresno Co.: Converse Basin, south fork of Kings River, July 1–13, 1899, *Eastwood* (9).—North fork of Kings River, 7000 ft., July, 1900, *Hall & Chandler* (no. 554) (2, 4).—Pine Ridge, 5400 ft., June, 1900, *Hall & Chandler* (no. 329) (9).

?General Grant National Park: July 20, 1892, *Brandegee* (9).

Tulare Co.: Open woods, middle fork of Tule River, alt. 5000–6000 ft., April, September, 1897, *C. A. Purpus* (no. 5606) (2, 3, 4).

Monterey Co.: In pine woods, Pacific Grove, August 27, 1903, *Heller* (no. 7197) (1); July, 1900, *Robert M. Horner* (9).—Monterey, *Miss Cannon* (9).

Los Angeles Co.: Dry ridges of foothills, May, 1888, *Dr. H. E. Hasse* (2, 9, 11).—Brushy foothills, April 28, 1888, *Hasse* (3).—Arroyo Seco Cañon, Pasadena, May 16, 1904, *Fordice Grinnell, Jr.* (9).—Ostrich farm near Los Angeles, April, 1888, *Hasse* (15).—One locality, a few

H. unalascensis

plants, under shade of Adenostoma, on volcanic upland, Avalon, Santa Catalina Isl., May, 1897, *Blanche Trask* (2).

Riverside Co.: Coast Range Mts., near S. Riverside, 1895, *W. I. Lester* (15).
San Diego Co.: San Diego, April, 1894, *Brandegee* (15).—Mesas, San Diego, May 8, 1884, *C. R. Orcutt* (7, 9, 16); San Diego, May 4, 1892, *G. W. Dunn* (9); on clay hills, San Diego, 1860–1, *Dr. J. G. Cooper* (3) (type of *H. Cooperi*); National Ranch, San Diego, May, 1882, *D. Cleveland* (no. 869) (3).—Alpine, *Mrs. Brandegee* (9).—Bluffs of the sea, Soledad, April 26, 1882, *Pringle* (7).

MEXICO, Lower California

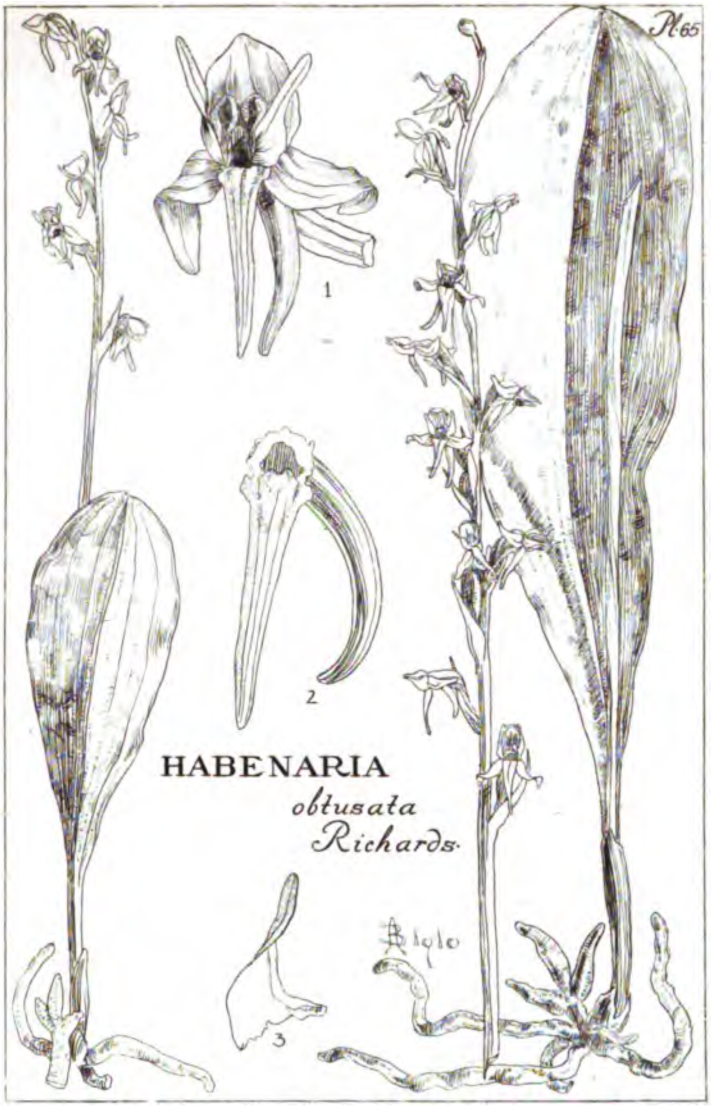
1888, *Dr. Palmer* (2); May, 1885, *D. Cleveland* (10).—Sierra Nevada Mts., 1875, *Lemmon* (2); *Thomas Bridges* (no. 355) (2).—Pine woods near Fawn (?) Valley, July 25, 1886, *C. F. Sonne* (no. 8) (9).—Grove of large trees (*Sequoia gigantea*) 1865, *J. Torrey* (no. 512) (3).—1868–9, *Dr. A. Kellogg & W. G. W. Harford* (no. 960) (3).

H. obtusata

20. **H. obtusata** (*Pursh*) *Richardson*, in Frankl. Journ. App. 750 (1823); *Spreng.*, Syst. Veg. 3: 689 (1826); *Graham*, in Edinb. Phil. Journ. App. (1830); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Hook. & Arn.*, Bot. Beechey 130 (1841); *Gray*, Man. ed. 5, 501 (1867), ed. 6, 508 (1890); *Porter & Coulter*, Syn. Fl. Col. 132 (1874); *Perkins*, Gen. Cat. Vt. 37 (1882); *Upham*, Fl. Minn. 140 (1884); *Coulter*, Rocky Mt. Bot. 348 (1885); *Macoun*, Cat. 4: 16 (1888); *Perkins*, Fl. Vt. 277 (1888); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Fernald*, in Portl. Cat. 64 (1892); *Rand & Redf.*, Fl. Mt. Desert 153 (1894); *Baldw.*, Orch. N. Eng. 78, 79, f. 23 (1894); *Britton & Vail*, in Bull. Herb. Boiss. 3: 203 (1895); *Nelson*, Fl. Wyo. 182 (1896); *Britton & Br.*, Ill. Fl. 1: 461, f. 1098 (1896); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Delabarre*, in Bull. Geog. Soc. Phil. 3: 191 (1902); *Kennedy*, Fl. Willoughby in Rho. 6: 111 (1904); *Jelliffe*, Gibson's Nat. Orch. 33, t. 15 (1905).

PLATE 65. *Habenaria obtusata*

1. Flower. 2. Labellum and spur. 3. Petal. All the analytical parts drawn, enlarged, with the aid of the camera lucida. The general habit taken from living specimens.


Pl. 65
1
2
HABENARIA
obtusata
Richards.
3
B 1910

ORCHIDACEÆ

H. obtusata

Orchis obtusata *Pursh*, Flora 2: 588 (1814); *Nutt.*, Gen. 2: 189 (1818); *Eaton & Wr.*, N. A. Bot. ed. 8, 334 (1840); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book, ed. 41, 583 (1856); *Provanch.*, Fl. Canad. 2: 565 (1862).

Platanthera obtusata *Lindl.*, Gen. & Sp. Orch. 284 (1835); *Hook.*, Fl. Bor. Am. 2: 196, t. 199 (1839); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Torr.*, Fl. N. Y. 2: 274 (1843); *Gray*, Man. ed. 1, 470 (1848), ed. 2, 444 (1856), ed. 3, 444 (1859); *Reichb. f.*, Orch. Eur. 118 & 180, t. 75 (427), I & II, 1–4 (1851); *Ledeb.* Fl. Ross. 4: 68 (1853); *Wood*, Class-book 683 (1861); *Paine*, Pl. Oneida Co. 83 (1865); Portl. Cat. 7 (1868); *Correvon*, Orch. Rust. 174 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 623 (1899); *Finet*, in Rev. Gen. Bot. 13: 512 (1901). Not *P. obtusata* Schur.

Lysiella obtusata *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 104 (1900), in Britton's Man. 295 (1901); *House*, in Torreya 3: 51 (1903); *Eggleston*, in Torreya 4: 66 (1904); *Farr*, in Contr. Bot. Lab. Univ. Pa. 3: 28 (1907).

"*obtusata*. 20. O. labello lineari integerrimo cornu longiore, cornu longitudine germinis, folio unico radicali subcuneiformi-obtuso. *Herb. Banks. mss.*

"On Hudson's Bay, near Fort Albany. *Hutchinson.* ♃. *v. s. in Herb. Banks.* A small species, with a few flowers only." Pursh, *loc. cit.*

LABRADOR

1875, *W. A. Stearns* (2).—Turner's Head, August 6, 1892, *Waghorne* (6). —Battle Harbor, September 1, 1891, *Waghorne* (6).—Red Bay, July 4, 1892, *J. D. Sornborger* (no. 74) (3).—Hamilton Inlet, Indian River, August 2, 1891, Bowdoin College Exp. (no. 198) (3).—Hillsides, Butler's (10).

NEWFOUNDLAND

July 14, 1897, *A. C. Waghorne* (4).—Woods, Whitbourne, August 15, 1904, *Robinson & Schrenk* (no. 109) (2, 3, 4, 6, 7).—Near Blanc Sablon, *H. obtusata* July 27, 1893, *Waghorne* (4).—Woods, Fox Cove, Sandwich Bay, July 19, 1892, *Waghorne* (4).—Woods, Chimney Cove, July 21, 1895, *Waghorne* (2). —Woods, Middle Arm, Bay of Islands, August 22, 1896, *Waghorne* (no. 50) (3).—Cool River, Bay of Islands, July 14, 1896, *Waghorne* (no. 1) (3).—In spruce woods, Hell's Torrent, Canada Bay, July 30, 1887, *Wm. Palmer* (2).

NOVA SCOTIA

Cold peat bogs and damp woods, North Sydney, Cape Breton, July 11, 1883, *J. Macoun* (3), July 13, 1883, *Macoun* (6).—Damp woods, Baddeck, Cape Breton, July 24, 1898, *Macoun* (6).—Big Intervale, Cape Breton, July 14, 1898, *Macoun* (6).—Freemanville, July 26, 1885, *H. Trueman* (3). —Pictou, *C. B. Robinson, Jr.* (1).

NEW BRUNSWICK

Lily Lake, July 31, 1877, *J. Fowler* (5).

Restigouche Co.: Boggy places, Dalhousie, August, 1876, *R. Chalmers* (6).

Victoria Co.: Bald Mt., Tobique, July, 1884, *Geo. U. Hay* (6).—South Tobique Lakes, July 18, 1900, *Hay* (no. 52) (3).—Carry near Portage Lake, July 18, 1900, *Hay* (no. 48) (3).

Northumberland Co.: Little Miramichi, July 11, 1892, *Fowler* (4); August 5, 1892, *Fowler* (5).

Kent Co.: July 24, 1871, *Fowler* (16).

Charlotte Co.: Grand Manan, *Rothrock* (3).

St. John Co.: St. John, July 24, 1877, *Fowler* (2).

QUEBEC, Gaspé County

Mt. Albert, August 1, 1883, *Porter* (6).—Common in mossy woods, Little Fore River, July 31, 1882, *J. Macoun* (6).

Bonaventure Co.: Arbor vitæ swamp, New Carlisle, July 28, 1902, *Williams & Fernald* (3).—Arbor vitæ swamps, Carleton, July 24 and 27, 1904, *Collins, Fernald, & Pease* (1).—In moss on side of steep hill, Great Cascapedia River, July 14, 1905, *Ames* (1).—Arbor vitæ swamp, New Richmond, July 16, 1905, *Ames* (1).

Rimouski Co.: Swamp, Little Metis, August, 1902, *E. C. Jeffrey* (1).

Ottawa Co.: In a swamp near Wakefield, August 22, 1903, *Macoun* (6).

UNGAVA

Along a river, Southern Ungava, July, 1895, *A. P. Low* (6).—Mosquito Bay, east coast Hudson Bay, August 19, 1893, *Low* (6).—North of Cape

Jones, Hudson Bay, July 6, 1899, *Low* (6).—Boggy woods, Lake Mistassini, July 13, 1885, *J. M. Macoun* (6).

ONTARIO, Nipissing District

Camp woods, Cache Lake, Algonquin Park, July 4, 1900, *J. Macoun* (6). — Swamps, Golden Lake, July 26, 1899, *L. M. Umbach.*—In swamps and bogs, Cartwright, July 30, 1891, *W. Scott* (6).

Hastings Co.: Cedar swamps, July 17, 1870, *Macoun* (5); July 12, 1878, *Macoun* (6).—Madoc, June 17, 1897, *Scott* (6).

Wellington Co.: Guelph, August, 1903, *A. B. Klugh* (1).—Algona, One-Mile Portage, Nipigon River, July 3, 1884, *Macoun* (6).—Kakabeka Falls, July 14, 1869, *Macoun* (3).

KEEWATIN

Albany, James Bay, July 25, 1904, *W. Scott* (6).—Raft River, James Bay, August 9, 1904, *W. Spreadborough* (6).—Sixty miles up Kapisco River, west of James Bay, July 9, 1902, *W. J. Wilson* (6).

MANITOBA

In rich damp woods, Lake Winnipegosis, June 30, 1881, *J. Macoun* (6).

ASSINIBOIA

Boggy places, Cypress Hills, June 15, 1884, *J. M. Macoun* (6).—Springy places, Farewell Creek, Cypress Hills, June 27, 1895, *J. Macoun* (6).—Regina, 1903, *T. N. Willing* (1).—Springy places, Indian Head, June, 1892, *W. Spreadborough* (6).

SASKATCHEWAN

In the Muskeg, north of Prince Albert, July 8, 1896, *J. Macoun* (6).

ATHABASCA

Rapids of the Drowned Slave River, June 28, 1892, *Miss E. Taylor* (no. 12) (3).—Smith Portage, Great Slave River, July 1, 1892, *Taylor* (no. 24) (6).

ALBERTA

Boggy ground along Cave Avenue, Banff, 4500 ft., July 3, 1899, *W. C. McCalla* (no. 2233) (2, 5).—Swamps, Spray Avenue, Banff, June 30, 1891, *J. Macoun* (6).—Rocky Mountain National Park, Banff, March 12, 1904, *N. B. Sanson* (1); July 4, 1891, *Macoun* (2).—Devil's Head Lake, National Park, 4500 ft., July 7, 1899, *Sanson* (6).—Between Field and Emerald Lake, Rocky Mountain Park, August 20, 1904, *Macoun* (1).—Jumping Pound Creek, June 14, 1897, *Macoun* (2, 6).—MacLeod River, *H. obtusata* North Alberta, *W. Spreadborough*, June 22, 1898 (6).—Fiddle Creek, Athabasca River, June 29, 1898 (6).—Boggy places, Red Deer, June, 1895, *Gaetz* (6).—Kananaskis, June 15, 1885, *Macoun* (6).

BRITISH COLUMBIA

In rich damp woods, Gatcho Lake, July 25, 1876, *Dawson* (6).—Damp woods, North Thompson River, June 14, 1889, *J. M. Macoun* (6).— In swamps and bogs, MacLeod Lake, lat. 55, June 23, 1875, *J. Macoun* (6).

MACKENZIE

Near Fort Wrigley, Mackenzie River, July 20, 1892, *Miss E. Taylor* (2).—Mackenzie River, 1861–2, *I. S. Onion*.—Barren grounds, west shore of Great Bear Lake, June–August, 1900, *J. M. Bell* (6).

YUKON

Mountains back of Dawson, July 12, 1902, *J. Macoun* (1).

ALASKA

Icuguay, August 28, 1897, *Wm. M. Canby* (no. 278) (3).—Nushagak, near station, June 28, 1881, *C. L. McKay* (16).—Popoff Isl., July 10, 1899, *Trelease & Saunders* (no. 3303) (4).—Shumagin Isl., *W. M. Harrington*, Dall's Expedition, 1871–2 (4).—Nagai Isl., August 1, 1872, *Harrington* (3).

MAINE, Aroostook County

Mossy woods, St. Francis, August 7, 1893, *M. L. Fernald* (no. 104) (2, 3, 4, 6).—St. Francis River, August 11, 1902, *W. W. Eggleston* (no. 3045) (1).—Mapleton, July 11, 1902, *Williams, Collins & Fernald* (1, 3).—Cedar swamp, Fort Kent, July 8, 1900 (1), 1903 (1), *Dr. D. W. Fellows;* mossy cedar swamp, July 8, 1904, *A. A. Eaton* (no. 16) (1).—Dry mossy pine hillside, Bickerbrook, near Fort Kent, July 16, 1904, *Eaton* (no. 145) (1).

Piscataquis Co.: Mt. Katahdin, *Young* (3).—*In sylvis humidis*, Mt. Katahdin, June, 1860, *J. W. Chickering* (16).—Howard, *Susan M. Hallowell* (2).—Cedar swamp, moss and moist sphagnum, east end of Deer Pond, July 15, 1905, *F. T. Hubbard* (1).—Alder swamp near Beaver Pond by Togue Lake, July 12, 1905, *Hubbard* (no. 4) (1).—In moss, T. 15, R. 9, July 12, 1905, *Hubbard* (no. 5) (1).

Somerset Co.: In rich, damp woods, John's Pond, Jackman, July 19, 1903, *E. R. Hodson* (no. 64) (2).

Franklin Co.: Mossy cedar swamp, Chesterville, July 18, 1902, *C. H.*

Knowlton (no. 986) (1); evergreen swamp, July 14, 1908, *Lillian O. Eaton* (1).

Hancock Co.: Swamps, Little Cranberry Isl., August 12, 1885, *John H. Redfield* (4).

NEW HAMPSHIRE

Woods, side of White Mts., July, 1862, *J. Blake* (4, 16).—White Mts., June 20, 1860, *J. W. Chickering, Jr.* (8); damp woods, July 10, 1862, *Chickering* (2); *Oakes* (2, 3); August 8, 1881, *Warren H. Manning* (6).

Coos Co.: Mt. Adams, July and August, 1889, *Clara E. Cummings* (4).—Bogs on mountain side, Crawford House, August 22, 1895, *E. H. Eames* (2).—Wet woods near Crawford's, July 7, 1878, *C. E. Faxon* (7).—Base of Mt. Washington, "7, VIII," 1878, *J. A. Allen* (3).—Between Jackson and Carter Notch, July 14, 1890, *Faxon* (3).—Hermit Lake, Tuckerman's Ravine, alt. 3800 ft., August 15–20, 1898, *W. W. Eggleston* (5); July 26, 1882, *Jos. Schrenk* (6, 10).

Grafton Co.: Profile House, July 18, 1892, *H. H. Rusby* (10).—In moss under dwarf conifers, Mt. Lafayette, July 9, 1891, *J. F. Collins* (2).

VERMONT

Killington Peak, August 10, 1875, *Mr. & Mrs. A. P. Morgan* (7).

Orleans Co.: Willoughby Lake, June, 1889, *G. H. Leland* (5); July 11, 1903, *E. J. Winslow* (1); July 29, 1892, *H. H. Rusby* (10).—Cedar woods, July 27, 1904, *A. A. Eaton* (no. 246) (1).—Mt. Annance, Willoughby Lake, July 2, 1884, *Boot* (3).

Essex Co.: Canaan, August 2–12, 1899, *W. W. Eggleston* (no. 1625) (2).

Caledonia Co.: Swamp between Willoughby and West Burke, July 20, 1887, *Faxon* (3).—Swamps, Sutton, July 15, 1887, *Faxon* (3); July 15, 1887, *Faxon* (2, 16).—Peacham, July 21, 1892, *Alice F. Stevens* (2).—Hollow woods, Peacham, 1881 (8), July 6, 1884 (4), July 17, 1886 (4), July 21, 1892 (4), *F. Blanchard.*

Chittenden Co.: Sphagnous bog, Mt. Mansfield, August 22, 1880, *C. G. Pringle* (7); shaded sphagnous woods, July 7, 1894, *W. W. Eggleston* (2).

Addison Co.: Lost Pleiad Lake, Hancock, July 18, 1878 (10), June 26, 1883 (1), July 6, 1890 (5), *E. Brainerd.*—Mountain woods, Hancock, July 18, 1878, *Brainerd* (7).

MASSACHUSETTS, Hampshire County

South Hadley, 1887, *A. C. Clark* (2).

H. obtusata NEW YORK

North woods, August 17, 1879, *Lester F. Ward* (2).—In a balsam swamp, St. Regis Falls, June 10, 1903, *E. R. Hodson* (no. 19) (2).

Franklin Co.: West of Upper Saranac Lake, July 1, 1899, *Rowlee, Wiegand & Hastings* (3).

Essex Co.: Adirondacks, August 10, 1877, *Addison Brown* (8).—Upper flank of Whiteface Mt., Adirondacks, July 22, 1870, *J. H. Redfield* (4).

Herkimer Co.: North woods, *J. A. Paine* (3).

MICHIGAN, Isle Royale

Deep moist woods, July, 1889, *J. H. Sandberg* (1, 5).

Keweenaw Co.: Keweenaw Point, 1863, *Dr. Robbins* (4).—Woods, July, 1888, *O. A. Farwell* (no. 515) (3).—Low ground, Clifton, August, 1884, *F. E. Wood* (2).—June, 1886, *Farwell* (no. 515) (11).

Marquette Co.: In swamps of Coniferæ, Turin, June 24, 1901, *Bronson Barlow* (2).—Marquette, July 9, 1883, *G. F. A.* (2); 1863, Hb. Canby (16).

Chippewa Co.: Sault de Ste. Marie, July, 1865, *T. C. Porter* (16).

Mackinac Co.: Mackinac, July 4, 1879, *Thos. E. Boyce* (1).

Cheboygan Co.: July 13, 1890, *H. C. Beardslee* (1, 5); cedar swamp, July 10, 1890, *Beardslee & Kofoid* (4).

Emmett Co.: Cedar swamp, Little Traverse Bay, August 3, 1897, *C. W. Fallass* (5).

WISCONSIN

Door, July 27, 1887, *J. H. Schuette* (1).

Oneida Co.: Mossy woods, borders of Spirit Lake, June 19, 1898, *S. C. Wadmond* (5).

MINNESOTA

Shoot Line Park, July, 1889, *F. F. Wood* (no. 171) (2).

Lake Co.: Two Harbors, July, 1891, *J. H. Sandberg* (no. 467) (2).

St. Louis Co.: With Moneses, Mud Lake, Vermillion Lake, July 24, 1886, *J. C. Arthur, L. H. Bailey, Jr., & E. W. D. Holway* (no. B 380) (3).

Beltrami Co.: Bogs, Itaska Lake, June 26, 1891, *Sandberg* (no. 1054) (8).

Wright Co.: Rich woods, Silver Creek, August 29, 1891, *Sandberg* (no. 911) (2).

MONTANA, Flathead County

Columbia Falls, July 6, 1895, *R. S. Williams* (no. 628) (5).

Meagher Co.: Clendenin, Belt Mts., July 3, 1889, *Williams* (no. 628) (2).

H. obtusata

WYOMING

Soda Butte, Yellowstone Park, July, 1885, *Frank Tweedy* (2, 16).

COLORADO

Rocky Mts., 1862, *Hall & Harbour* (no. 536) (3, 4, 16); 1872, *C. C. Parry* (16).—Sawatch Range, alt. 10,500 ft., July, 1880, *T. S. Brandegee* (4, 9).—Rocky Mts., 1872, *E. L. Greene* (9).—Wet places, upper Clear Creek Valley, August 6, 1874, *G. Engelmann* (4).—Beaver Creek Camp, July 15, 1898 (4).—Rich soil along mountain stream, Berthoud Pass, near Cozzen's, alt. 8500 ft., August 15, 1884, *Chas. S. Sheldon* (no. 221) (15).

LORIMER Co.: Mountains, 9500 ft., July 7, 1896, *C. S. Crandall* (4).

GRAND Co.: Head-waters of Clear Creek and alpine ridges east of Middle Park, 1861, *C. C. Parry* (no. 355) (3, 4).—Middle Park, July, 1871, *T. S. Brandegee* (no. 135) (3).

SUMMIT Co.: Near Breckenridge, August, 1901, alt. 9800 ft., *K. K. Mackenzie* (no. 201) (4), (no. 14) (5).

CLEAR CREEK Co.: Wet mossy banks along streams, Berthoud Pass, near Georgetown, 8500 ft., August 15, 1884, *Sheldon* (no. 221) (2).

LAKE Co.: Twin Lakes, 10,000 ft., July 31, 1873, *J. M. Coulter*, Hayden Geological Survey (2).—At 10,000 ft. altitude in the Willis Gulch, July 7, 1896 (Biltmore no. 2525 a) (5).

LA PLATA Co.: Along dark, mossy banks of stream, Chicken Creek, West La Plata Mts., June 27, 1898, *Baker, Earl & Tracy* (no. 801) (2, 3, 4, 5, 10, 14).

NORWAY, FINMARK

Kaafjord prope Alten, Th. M. Fries (3).

H. Chorisiana

21. **H. Chorisiana** *Cham.*, in Linnæa 3: 31 (1828); *Macoun*, Cat. 4: 14 (1888); *Grace E. Cooley*, in Bull. Torr. Bot. Cl. 19: 245 (1892).

Peristylus Chorisianus *Lindl.*, Gen. & Sp. Orch. 297 (1835); *Hook.*, Fl. Bor. Am. 2: 201 (1839); *Ledeb.*, Fl. Ross. 4: 71 (1853).

Platanthera Chorisiana *Reichb. f.*, Orch. Eur. 128, t. 83 (485), II–IV, 4–6 (1851); *Kränzl.*, Orch. Gen. et Sp. 1: 615

H. Chorisiana (1899) in part;[1] *Finet*, in Bull. Soc. Bot. Fr. 47: 278 (1900).

"8. HABENARIA *Chorisiana*. Nob.

"P. foliis subradicalibus duobus ovatis, labello integerrimo obtuso lacinias haud excedente, calcare scrotiforme.

"Habitat in montosis Unalaschcæ passim.

"*Satyrium* L.

"Transitum generis *Platanthera* in *Gymnadenias galeatas* Rich. demonstrans, superiori speciei affinis; diversa: statura minori vix digitali, foliis ovatis, spica pauci- 10–12 flora, bracteis instructa flores superantibus, cornu scrotiformi etc. Radix: tubera duo fusiformia, gracilia, descendentia, radiculis fibrosis paucis ad collum instructa. Folia vaginantia subradicalia duo, vagina extima aphylla accedente; externum inferumve latius atque obtusius, late ovatum, in speciminibus majoribus 16 lineas longum, 10 latum; internum superumve in aliis speciminibus approximatum, in aliis paulo altius in caule situm, acutius et angustius; rete vasculosum e nervis primariis utrinsecus circiter 6 constans, arcuatis, in apicem submucronulatum conniventibus, venulis obliquis inter se connexis. Caulis digitalis, sæpius brevior, in unico specimine sexpollicaris, gracilis, supra parte nudus, unicove foliolo instructus sessili lanceolato acuto. Spica unguicularis pollicarisve 10–20 flora; bracteæ folio caulino similes, varia longitudine, floribus semper longiores; flores quam in præcedente specie minores, erecti. Germen simile, contortum, erectum, rectum, crassiusculum, maturo fructu ellipsoides. Calyx fornicatus, laciniis comparibus paulo discedentibus; laciniæ exteriores late lanceolatæ obtusæ; interiores consimiles paulo minores; labellum indivisum, obtusum, laciniis brevius, calcaratum, calcare brevi scrotiforme." Cham. *loc. cit.*

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[1] Kränzlin confused the details of *H. bracteata* on Reichenbach's plate with those of this species and prepared his diagnosis accordingly.

H. Chorisiana

The only material of *H. Chorisiana* which I have studied has been immature and unsatisfactory. In the Gray Herbarium there is a single specimen from Unalaska collected by Chamisso. The leaves, two in number, are basal or subradical. Above the leaves there is a single linear bract. The raceme is congested and bears buds only.

ALASKA

Chamisso (3).—Said by Kränzlin to have been collected in Unalaska by *Eschscholtz*.

JAPAN

According to Finet, *loc. cit.*

H. Hookeri

22. **H. Hookeri** *Torr., in hb.*, ex Gray in Ann. Lyc. Nat. Hist. N. Y. 3: 228 (1835?) *first impression.*—**H. Hookeriana** *Torr., in hb.*, ex Gray in Ann. Lyc. Nat. Hist. N. Y. 3: 229 (1836) *regular issue*, in Sill. Journ. 38: 311 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Britton*, Cat. N. J. 234 (1889); *MacMillan*, Metasp. Minn. Val. 167 (1892); *Britton & Br.*, Ill. Fl. 1: 461, f. 1097 (1896); *Clute*, Fl. Up. Susq. 105 (1898); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Mathews*, Field-book 86 (1902); *Jelliffe*, Gibson's Nat. Orch. 30, t. 14 (1905).—**H. orbiculata** *Goldie*, in Edinb. Phil. Journ. 6: 331 (1822); *Hook.*, Exot. Fl. 2: t. 145 (1825), excl. syn.; *Lodd.*, Bot. Cab. t. 1623 (1832). Not *Habenaria orbiculata* (Pursh) Torr., 1826 (*Orchis orbiculata* Pursh).

Platanthera Hookeri *Lindl.*, Gen. & Sp. Orch. 286 (1835); *Hook.*, Fl. Bor. Am. 2: 196 (1839); *Torr.*, Fl. N. Y. 2: 275 (1843); *Gray*, Man. ed. 1, 470 (1848), ed. 2, 445 (1856), ed. 3, 445 (1859); *Beck*, Bot. ed. 2, 347 (1856); *Wood*, Class-book 683 (1861); *Paine*, Pl. Oneida Co. 83 (1865); Portl. Cat. 7 (1868); *Correvon*, *H. Hookeri* Orch. Rust. 172 (1898); *Kränzl.*, Orch. Gen. et Sp. 1: 624 (1899). —**P. Hookeri** VAR. **oblongifolia** *Paine*, Pl. Oneida Co. 88 (1865).

Orchis Hookeri *Wood*, Am. Bot. & Flor. 327 (1870).

Habenaria Hookeri VAR. **oblongifolia** *Gray*, Man. ed. 5, 501 (1867), ed. 6, 508 (1890); *Macoun*, Cat. 4: 18 (1888); *Gray*, Field, For. & Gard. Bot. rev. ed. 408 (1895).—**H. Hookeri** *Torr.*, Gray Man. ed. 5, 501 (1867), ed. 6, 508 (1890), Field, For. & Gard. Bot. 326 (1868), rev. ed. 408 (1895); *Willis*, Cat. N. J. 61 (1874); Yale Cat. 45 (1878); *J. Robinson*, Fl. Essex Co. 107 (1880); *Arthur*, in Proc. Dav. Acad. Nat. Sci. 3: 2 (1880); *Britton*, Prel. Cat. N. J. 94 (1881); *Day*, Pl. Buffalo 139 (1882); *Perkins*, Gen. Cat. Vt. 37 (1882); *Jackson*, Fl. Worcester Co. 32 (1883); *Upham*, Fl. Minn. 140 (1884); *Dudley*, Cayuga Fl. 95 (1886); *Dame & Collins*, Middlesex Fl. 103 (1888); *Perkins*, Fl. Vt. 277 (1888); *Bennett*, Pl. R. I. 48 (1888); *Macoun*, Cat. 4: 17 (1888), Check-list 58 (1889); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Fernald*, in Portl. Cat. 64 (1892); *Rand & Redf.*, Fl. Mt. Desert 153 (1894); *Baldw.*, Orch. N. Eng. 102 (1894); *Deane*, Fl. Met. Park 79 (1896); *Mill. & Whit.*, Wild Fl. Northeast. St. 552, t. (1898); *Andrews*, Pl. Meriden Mt. no. 218 (1899); *Driggs*, Fl. Conn. 16 (1901); *Kennedy*, Fl. Willoughby in Rho. 6: 111 (1904).

Lysias Hookeriana *Rydb.*, in Britton's Man. 295 (1901); *House*, in Torreya 3: 51 (1903); *Small*, in Porter's Fl. Pa. 93 (1903).

Habenaria oblongifolia *Niles*, Bog-trotting for Orchids 250 (1904).

"*Scape* 8–12 inches high, bearing at the base two orbicular, oval or obovate leaves. *Leaves* fleshy, smooth and shining, 3–4 inches long. *Spike* 4–6 inches in length, somewhat loosely flow-

H. Hookeri

ered. *Flowers* 10–20, yellowish-green, erect or a little spreading, subsessile. *Bracteæ* lanceolate, nearly as long as the flowers. *Sepals* ovate-lanceolate, acute; the upper one connivent with the petals, erect; the lateral ones deflexed, so as to meet posteriorly. *Petals* a little shorter than the sepals, linear, very acute, dilated at the base. *Lip* lanceolate, acuminate, scarcely as long as the ovarium, standing forward and somewhat incurved. *Spur* straight, acute, depending, about twice the length of the ovarium. Cells of the *anther* linear-clavate, widely separated at the base by the broad stigmatic surface. *Ovarium* ½–¾ of an inch in length, straight." Gray, *loc. cit.*

The variety *oblongifolia* is surely only an individual variation. There is a specimen in the Gray Herbarium with leaves about 1 dm. long by about 4 cm. wide, collected at Little Falls, N. Y., by J. A. Paine, which is typical *H. Hookeri* var. *oblongifolia.*

In the third volume of the *Annals of the Lyceum of Natural History of New York,* on page 229, Gray published, presumably for the first time, the combination *Habenaria Hookeriana,* referring to "*Torrey, Herb.*" as authority for the name. In the library of the Gray Herbarium there is a copy of Gray's paper in quite a different edition of the *Annals,* in which the typography and pagination are not in agreement with the regular issue and in which, on page 228, *Habenaria Hookeri* is given instead of *H. Hookeriana.* This copy is accompanied by a manuscript note which states that the first impression was destroyed by fire. In my library there is a copy of the *Annals* bound up with the original covers. According to this copy it would appear that numbers 5, 6, and 7, in the last of which Gray's paper was published, were issued simultaneously in April, 1836. Beginning with these numbers the typography of the work changes. In the preceding numbers the typography is in agreement with that of

H. Hookeri Gray's copy to which reference has already been made. On the last page of the cover of the 1836 issue the following notice is printed: "The delay which has occurred in the publication of the present volume has been owing to a series of difficulties and misfortunes beyond the power of the Lyceum to guard against. The remaining numbers, comprising a *Monograph of the Cyperaceæ of North America* by Dr. Torrey, are now in the press, and will be speedily issued." Although Gray's paper was not regularly published before April, 1836, Lindley, in September, 1835, in his *Genera and Species of Orchidaceous Plants*, referred to the *Annals*, and adopted the specific name *Hookeri*. This leads naturally to the supposition that Lindley had a copy of the *Annals* similar to Gray's, and that originally Gray had adopted *Hookeri* and not *Hookeriana*. This also leads to the supposition that the first impression of Gray's paper may have been in the form of proof-sheets and not a valid publication. As Lindley's *Genera and Species of Orchidaceous Plants* on this assumption antedated Gray's paper in the second issue of the *Annals*, it would seem that *Hookeri* must stand as the correct name of the species. I have suggested 1835 as the date of the first impression of Gray's paper, as it was not read until December, 1834.

CANADA, Hb. Pursh (3),

NOVA SCOTIA, GUYSBOROUGH COUNTY
Rich woods, Pirates' Cove, July 6 and 7, 1883, *J. Macoun* (3, 6); July 7, 1884, *Macoun* (16).
ANNAPOLIS CO.: Annapolis, *Macoun* (?) (6).

NEW BRUNSWICK, VICTORIA COUNTY
Mountain back of Clair's, July 11, 1904, *A. A. Eaton* (no. 92) (1).
NORTHUMBERLAND CO.: Little Miramichi River, July 11, 1892, *J. Fowler* (2).
KENT CO.: In swamps and bogs, Bass River, July 20, 1867, *Fowler* (6).
YORK CO.: Boggy places, Campbellton, July, 1877, *R. Chalmers* (6).

QUEBEC, Rimouski County

Pine woods at crest of headland south of l'Anse Original, Bic, July 17, 1904, *J. F. Collins & M. L. Fernald* (1).

ONTARIO, Thunder Bay District

Pic River, *Loring* (3).

Carleton Co.: In swampy woods, Leonard, east of Ottawa, May 16, 1903, *J. Macoun* (6).—Woods, Rockcliffe, Ottawa, May 8, 1891, *J. M. Macoun* (6).

Frontenac Co.: Kingston, June 12, 1886, *J. Fowler* (4).

Hastings Co.: Cedar swamps, July, 1864, *J. Macoun* (16).—In swamps, Oak Hills, August 16, 1874, *Macoun* (6).

Lincoln Co.: Foster's Flats, Niagara, June 7, 1891, *J. Macoun* (6).

MAINE, Aroostook County

Spruce woods, mountain-side back of hotel, Fort Kent, July 8, 1904, *A. A. Eaton* (no. 30) (1).—Three and a half miles west of Fort Kent, July 18, 1904, *Eaton* (no. 154 a) (1).

Somerset Co.: In rather flat mixed woods, Skowhegan, July 1, 1903 *Eaton* (1).

Penobscot Co.: Orono, 1882, *Mrs. C. H. Fernald* (2); June, 1898, *P. L. Ricker* (no. 424) (2).

Franklin Co.: High woods, Mt. Saddleback, July 16, 1902, *C. H. Knowlton* (no. 491) (1).—Woodland, North Chesterville, June, 1902, *Lillian O. Eaton* (1).—Chesterville, July 19, 1902, *Knowlton* (1).

Oxford Co.: Woods, Dixfield, June, 1884, *J. C. Parlin* (3).—Fryeburg, July, 1872, *Faxon* (3).—Norway, 185–, *A. Gray* (3); *S. I. Smith* (16).

Kennebec Co.: Winthrop, 1864, *E. L. Sturtevant* (4).—Augusta, June 20 and 29, 1886, *E. C. Smith* (4).

Cumberland Co.: Harrison, *A. P. Chute* (3).

York Co.: Near Long Pond, East Parsonsfield, June 6, 1902, *R. G. Leavitt* (1).—North Parsonsfield, June 19, 1902, *Flora L. Gerrish* (1).

NEW HAMPSHIRE

White Mts., *Susan M. Hallowell* (2).

Coos Co.: Shelburne, July, 1872, *Faxon* (3).

Grafton Co.: Forest Hills, Franconia, September 30, 1892, *Faxon* (3); Wallace Hill, Franconia, July 26, 1891, *Faxon* (3); June 9, 1893, *Faxon* (3).—Holderness, June 6, 1886, *Faxon* (3).—Rather open woods, *H. Hookeri* Breezy Hill, Lisbon, May 24, 1903, *J. G. Hall* (1); May 31, 1903, *Hall* (3).

CARROLL Co.: On way to Sandwich Dome, 2000 ft., Sandwich, June 17, 1899, *John H. Sears* (3). —Dry woods on mossy knolls Green Mts., Effingham, June, 1902, *R. G. Leavitt* (1).

HILLSBOROUGH Co.: Milford, June, 1902, *J. A. Wheeler* (1).

VERMONT, ORLEANS COUNTY

Willoughby Mt., August, 1865, *Dr. F. J. Bumstead* (6).

CALEDONIA Co.: Barnet, June 29, 1888, *Dr. F. Blanchard* (2, 4).

CHITTENDEN Co.: Hills, under poplars, Charlotte, June 1, 1878, *C. G. Pringle* (7); June 9, 1876, *Pringle* (1). —Burlington, May, 1891, *L. R. Jones* (?) (5).

ADDISON Co.: Lost Pleiad Lake, Hancock, June 10, 1902, *E. Brainerd* (1). —Monkton, October 9, 1878, *C. G. Pringle* (7).—Middlebury, June 20, 1880, *Thos. E. Boyce* (1); June 6, 1886, *Brainerd* (1, 5).—Salisbury, July 25, 1903, *W. W. Eggleston* (1).

RUTLAND Co.: Rutland, July 14, 1898, *Eggleston* (5).

BENNINGTON Co.: Manchester, June 27, 1898, *Mary A. Day* (no. 170) (2, 3, 5).

MASSACHUSETTS, WORCESTER COUNTY

Worcester, Hb. Gray (3).

FRANKLIN Co.: Shelburne, June 24, 1873, *Miss S. E. Anderson* (10).

HAMPSHIRE Co.: Mt. Holyoke, June 9, 1869, *H. G. Jesup* (16).—Rich soil, foot of Holyoke Range, South Hadley, May 27, 1905, *R. G. Leavitt* (1).

HAMPDEN Co.: Westfield, 1873, *H. H. Rusby* (10).—Granville, June, 1883, *A. B. Seymour* (1).

CONNECTICUT, MIDDLESEX COUNTY

Middletown, June, 1835, *S. B. Buckley* (4).

NEW YORK, HERKIMER COUNTY

Little Falls, *S. H. Wright* (1); July, 1854, *J. A. Paine* (3) (*H. oblongifolia*). —Herkimer, *A. Gray* (3).

WASHINGTON Co.: Dry woods, lower Adirondacks, June 28, 1892, *Stewart H. Burnham* (14).—Mountain woods, west of Fort Ann, June 30, 1892, *Burnham* (1).—East Greenwich, 1867, *Dr. Asa Fitch* (10).—Fort Edward, 1892, *W. W. Jefferis* (4).

CAYUGA Co.: Owasco, June 15, 1885, *F. V. Coville* (2).

ONONDAGA Co.: Otisco, *S. N. Cowles* (no. 868) (4).—Manlius, June 3, 1889, *Calvin C. Bayley* (18).

Otsego Co.: Cooperstown, August, 1886, *Rev. C. H. Hall* (11).
Yates Co.: Penn Yan, *Dr. Sartwell* (3).
Tompkins Co.: Near Ithaca, June 8, 1885, *O. E. Pearce* (2).—Turkey Hill. Ithaca, October 15, 1892, *Jos. Schrenk* (4).—Devil's Glen, Ithaca, July 6, 1878, *Wm. Trelease* (4).—Ball Hill, near Danby, July 22, 1893, *Schrenk* (4).
Chemung Co.: Rich upland woods, rare, June 16, 1898, *Dr. T. F. Lucy* (no. 699) (5).
Sullivan Co.: Cochecton, August 10, 1889, *H. Schrenk* (4).
Westchester Co.: Peekskill, June, Hb. Thurber (3).

PENNSYLVANIA, Munroe County
Delaware Water Gap, 1874, *S. W. Knipe* (16).—Fox Hill, June, 1872, *Knipe* (2, 4).
Blair Co.: Bald Eagle Furnace, June 3, 1860, *Böcking* (3).

OHIO
Wm. Krebs (1).

MICHIGAN
Michigan (3).
Keweenaw Co.: Evergreen woods, frequent, August, 1890, *O. A. Farwell* (3).—Copper Harbor, August 15, 1888, *Farwell* (11).—Rich woods, Keweenaw Point, July 7, 1884, *F. E. Wood* (2).
Montcalm Co.: Stanton, 1878, *Erwin F. Smith* (no. 41) (2).
Ionia Co.: Hubbardston, May, 1876, *C. F. Wheeler* (8).
St. Clair Co.: Ann Arbor, May 28, 1863, *Lewis Foote* (16).—Port Huron, June 21, 1896, *Chas. K. Dodge* (5).
Wayne Co.: Near Detroit, June 21, 1863, *Wm. Boott* (3).

WISCONSIN, Oconto County
June, *F. H. Plumb* (2).
Door Co.: Newport, June 22, 1883, *J. H. Schuette* (1).
Dane Co.: Madison, 1890, *L. S. Cheney* (3).
Milwaukee Co.: Woods, Milwaukee, June, 1843, *I. A. Lapham* (4).

MINNESOTA, Beltrami County
Copse, Itasca Lake, July, 1891, *Geo. B. Aiton* (2); bogs, Itasca Lake, June 30, 1891, *J. H. Sandberg* (no. 1102) (2).
Cass Co.: Lake Kilpatrick, June, 1893, *C. A. Ballard* (5).
Chisago Co.: Franconia, 1890, *J. M. Holzinger* (2).
Goodhue Co.: Zumbrota, June, 1892, *A. L. Ballard* (2, 5, 14).

H. Hookeri IOWA, FAYETTE COUNTY
Fayette, June, 1893, *B. Fink* (2).

H. orbiculata 23. **H. orbiculata** (*Pursh*)[1] *Torr.*, Comp. 318 (1826); *Spreng.*, Syst. Veg. 3: 689 (1826); *Lodd.*, Bot. Cab. t. 1623 (1832); *Gray*, in Ann. Lyc. Nat. Hist. N. Y. 3: 228 (1836); *Dewey*, Herbaceous Pl. Mass. 198 (1840); *Gray*, in Sill. Journ. 28: 311 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Gray*, Man. ed. 5, 501 (1867), ed. 6, 508 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 408 (1895); *Willis*, Cat. N. J. 61 (1874); *Swezey*, Cat. Pl. Wisc. (1877); Yale Cat. 45 (1878); *J. Robinson*, Fl. Essex Co. 108 (1880); *Britton*, Prel. Cat. N. J. 94 (1881); *Perkins*, Gen. Cat. Vt. 37 (1882); *Upham*, Fl. Minn. 140 (1884); *Dudley*, Cayuga Fl. 95 (1886); *Macoun*, Cat. 4: 18 (1888); *Dame & Collins*, Fl. Middlesex 103 (1888); *Perkins*, Fl. Vt. 277 (1888); *Britton*, Cat. N. J. 234 (1889); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Fernald*, in Portl. Cat. 64 (1892); *Baldw.*, Orch. N. Eng. 101, f. 31 (1894); *Rand & Redf.*, Fl. Mt. Desert 153 (1894); *Holzinger*, in Contr. U. S. Nat. Herb. 3: 252 (1895); *Millsp. & Nutt.*, Fl. W. Va. 200 (1896); *Britton & Br.*, Ill. Fl. 1: 461, f. 1096 (1896); *Clute*, Fl. Up. Susq. 106 (1898); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900); *Gattinger*, Fl. Tenn. 62 (1901); *Howell*, Fl. Nw. Amer. 629 (1902); *Mathews*, Field-book 86 (1902); *Niles*, Bog-trotting for Orchids 250 (1904); *Kennedy*, Fl. Willoughby in Rho. 6: 111 (1904); *Jelliffe*, Gibson's Nat. Orch. 25, 29, 53, t. 13 (1905); *Ames*, in Rho. 8: 1, fig. (1906). Not *H. orbiculata* Hook., Exot. Fl. (= *H. Hookeri*).

?**Orchis bifolia** *Forst.*, Cat. Pl. N. A. 39 (1771), not *L.*— ?**O. lata** *Walt.*, Fl. Carol. 220 (1788).—**O. orbiculata** *Pursh*,

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[1] Nearly all the works cited include *H. macrophylla*.

Fl. 2: 588 (1814); *Eaton*, Man. ed. 4, 375 (1824); *Torr.*, Cat. N. Y. 69 (1819); *Big.*, Fl. Bost. ed. 2, 319 (1824), ed. 3, 342 (1840); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 41, 532 (1856); *Provanch.*, Fl. Canad. 2: 565 (1862). *H. orbiculata*

Platanthera orbiculata *Lindl.*, Gen. & Sp. Orch. 286 (1835); *Darl.*, Fl. Cestr. ed. 1, 505 (1837), ed. 3, 311 (1853); *Hook.*, Fl. Bor. Am. 2: 196, t. 200 (1839); *Eaton & Wr.*, N. A. Bot. ed. 8, 361 (1840); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Torr.*, Fl. N. Y. 2: 274 (1843); *Gray*, Man. ed. 1, 470 (1848), ed. 2, 444 (1856), ed. 3, 444 (1859); *Beck*, Bot. ed. 2, 346 (1856); *Chapm.*, Fl. S. U. S. ed. 1, 459 (1860), ed. 2, 459 (1884), ed. 3, 485 (1897); *Wood*, Class-book 683 (1861); *Paine*, Pl. Oneida Co. 83 (1865); Portl. Cat. 7 (1868); *Tracy*, Essex Fl. 81 (1892); *Correvon*, Orch. Rust. 174 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 624 (1899).—**P. Menziesii** *Lindl.*, Gen. & Sp. Orch. 286 (1835); *Hook.*, Fl. Bor. Am. 2: 197 (1839); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Correvon*, Orch. Rust. 174 (1893). Not *P. Menziesii* Kränzl. (= *H. elegans*).

Habenaria Menziesii *Macoun*, Cat. 4: 17 (1888).

Lysias orbiculata *Rydb.*, in Mem. N. Y. Bot. Gard. 1: 103 (1900), in Britton's Man. 294 (1901); *Small*, in Porter's Fl. Pa. 93 (1903); *House*, in Torreya 3: 51 (1903); *Eggleston*, in Torreya 4: 66 (1904); *Harshburger*, in Torreya 5: 192 (1905); *Piper*, Fl. Wash. in Contr. Nat. Herb. 11: 208 (1906).

"*orbiculata.* 16. O. labello lineari integerrimo obtusiusculo, petalis 3. superioribus conniventibus, 2. lateralibus patentibus basi obliquis, cornu germine longiore, scapo basi diphyllo, foliis planis orbiculatis.

"In shady beech-woods: on the mountains of Pensylvania and Virginia. ♃. July, Aug. *v. v.* Resembles *O. bifolia.* Two leaves of a fleshy texture are spread flat on the ground, between

H. orbiculata

which rises the stalk about a foot or eighteen inches high, which bears a loose spike of greenish-white flowers. It is known in the mountains by the name of *Heal-all.*" Pursh, *loc. cit.*

In the herbarium at Kew there is a specimen of *Habenaria orbiculata* which appears to be the type. On the reverse of the sheet on which it is mounted, in the upper left-hand corner, the name "Fred Pursh" is written. Presumably, this specimen was obtained by Hooker when the Lambert collection was sold, as Lambert possessed Pursh's herbarium. The specimen in question is surely conspecific with *Platanthera Menziesii.*[1]

LABRADOR

Labrador Swamp, Ryegate, July 8, 1884, *Dr. F. Blanchard* (4).

NOVA SCOTIA, Victoria County

New Campbellton, July 23, 1897, *David White & Chas. Schuchert* (no. 25) (2).

Inverness Co.: Rich woods, Whycocomagh, July 20, 1883, *J. Macoun* (6).

PRINCE EDWARD ISLAND, Queens County

Shady woods, Brackley Point, August 14, 1888, *J. Macoun* (6).

NEW BRUNSWICK, Victoria County

Boggy woods, Little Tobique River, July, 1884, *Geo. U. Hay* (6). — Evergreen forest back of Clair's, July 11, 1904, *A. A. Eaton* (no. 93) (1).

Northumberland Co.: Woods, Nepisiquit River, August, 1902, *Robert Johnstone* (6). — Deep woods, Nepisiquit Lake, July, 1884, *R. Chalmers* (3). — Little Branch, Miramichi, July 11, 1892, *J. Fowler* (7).

Kent Co.: Bass River, July 27, 1870, *Fowler* (3).

QUEBEC, Gaspé County

In rich damp woods, Ste. Anne des Monts, August 9, 1883, *Porter* (6); rich cool woods, rather rare, August 22, 1882, *J. Macoun* (6). — Swamp, Little Metis, August, 1902, *E. C. Jeffrey* (1).

Quebec Co.: Lake Edward, August 11, 1897, *J. W. Blankinship* (1).

Ottawa Co.: In woods north of the railway station, Wakefield, August 10, 1903, *Macoun* (6).

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[1] For a detailed study of *H. orbiculata, H. macrophylla* and *Platanthera Menziesii* reference should be made to *Rhodora* 8 : 1 (1906).

ONTARIO, Thunder Bay District

Rich woods, Lake Nipigon, July 12, 1884, *J. Macoun* (6).

Renfrew Co.: Swamp, Golden Lake, July 27, 1899, *L. M. Umbach* (2).

Nipissing Dist.: In woods, Island Lake, Algonquin Park, July 18, 1900, *Macoun* (6).

Hastings Co.: Pine woods, North Hastings, July 12, 1878, *Macoun* (6). —Rich woods, east of Belleville, July, 1870, *Macoun* (6).

Wellington Co.: Puslinch Lake, August 8, 1904, *A. B. Klugh* (1).

York Co.: Near Toronto, July 3, 1898 (Biltmore no. 2524a) (5).

MANITOBA

In rich woods, Swan Lake, July 10, 1881, *Macoun* (6).

BRITISH COLUMBIA

(?) Northwest America, *Menzies* (19, 20), (type of *Platanthera Menziesii*).

New Westminster Co.: In damp woods, Burrard Inlet, June, 1892, *Law* (6).

Kootenay Dist.: Deep woods near Ward's, Kootenay River, July 17, 1890, *Macoun* (6).—Rich woods, Donald, July 17, 1885, *Macoun* (6); July 9, 1885, *Macoun* (16).—Rich woods, Kootenay Lake, July 8, 1889, *Dawson* (6).—Woods, Grand Fork, head-waters of Frazer River, July 22, 1898, *W. Spreadborough* (6).—Nelson, September, 1903, *E. Jacobs* (1).—Moss in damp woods, Armstrong, July 16, 1904, *E. Wilson* (1).

Yale Dist.: Rich woods, Sicamous, July 8, 1889, *Macoun* (6).—Chilliwack Lake, July 24, 1901, *J. M. Macoun* (1); July 31, 1901, *Macoun* (1).

ALASKA

Port Chester (9).—Karta Bay, Prince of Wales Isl., 1901–2, *C. F. Newcombe* (no. 119) (3).

MAINE, Aroostook County

Cold woods, St. Francis, July 31, 1878, *C. G. Pringle* (7).—Very abundant in mossy spruce woods, valley of St. Francis River, August 11, 1902, *W. W. Eggleston & M. L. Fernald* (1, 3).—Deep humus of evergreen forest, St. John's Plantation, July 20, 1904, *A. A. Eaton* (no. 205 in part) (1).

Piscataquis Co.: Deciduous woods, North Squaw Brook, July 6, 1895, *Fernald* (no. 273) (3, 4).—Open rich mixed woods, trail to Deer Pond, July 24, 1905, *F. T. Hubbard* (no. 11) (1).

Hancock Co.: Swamp, Seal Harbor, Mt. Desert, July 28, 1885, *John H. Redfield* (4).

Oxford Co.: Norway, *S. I. Smith* (3).

H. orbiculata NEW HAMPSHIRE

White Mts., *Susan M. Hallowell* (2).—Shady woods, White Mts., July 13, 1862, *J. W. Chickering, Jr.* (2, 8).

Coos Co.: Woods at base of Mt. Washington, August, 1860, *Wm. M. Canby* (16).—Annie's Glen, Crawford's, September 9, 1893, *Faxon* (3).—Woods back of Mt. Pleasant House, July 19, 1891, *Faxon* (3).—Base of Mt. Washington, August 8, 1855, *Wm. Boott* (3).

Grafton Co.: Franconia, September 24, 1895, *Faxon* (3), July 26, 1891, *Faxon* (3); deserted farm, Franconia, September 24, 1895, *Faxon* (3); Pond Brook back of deserted farm, September 23, 1888, *Faxon* (3).—Breezy Hill, Lisbon, July 25, 1903, *J. G. Hall* (3).

VERMONT, Orleans County

Cold brook, Willoughby Lake, July 21, 1887, *Faxon* (3).

Caledonia Co.: Peacham, July 25, 1888, *F. Blanchard* (2); July 31, 1884, *Blanchard* (4).

Addison Co.: Middlebury, August 1, 1880, *Thos. E. Boyce* (1).—Lost Pleiad Lake, Green Mts., 1875, *Wm. E. Safford* (no. 426) (2).—Ripton, alt. 1500 ft., July 18, 1878, *E. Brainerd* (5).

MASSACHUSETTS, Middlesex County

Abundant, Sherbourne, July 13, 1890, *E. L. Sturtevant* (4).

Franklin Co.: Shelburne, June 15, 1873, *S. E. Anderson* (10).

Berkshire Co.: Washington, July 4, 1856, *Wm. Boott* (3).

Hampshire Co.: Cummington, 1838, *Dr. Dwight* (4).

NEW YORK

North woods, August 15, 1879, *Lester F. Ward* (2).

Essex Co.: Between Mirror Lake and Lake Placid, July 9, 1903, *Miss Jessie Ames* (1).—West of Upper Saranac Lake, July 3, 1899, *Rowlee, Wiegand & Hastings* (3).

Herkimer Co.: Near North Lake, July, 1897, *Dr. Joseph V. Haberer* (no. 1384) (3).

Washington Co.: East Greenwich, 1869, *Dr. Asa Fitch* (10).

Onondaga Co.: Manlius (?), August, 1837, *J. D. Dana* (18); 1845, *Dr. W. M. S(mith?)* (18).

Yates Co.: *S. H. Wright* (1).

Columbia Co.: Dark woods, rare, Lebanon Spa, July 14, 1888 (2).

Greene Co.: Catskill Mts., 1845, *Geo. Thurber* (3); July, 1868, *Wm. M. Canby* (16).

PENNSYLVANIA

?Pursh (20), (type of *Orchis orbiculata*).

Westmoreland Co.: June 21, 1878, *P. E. Pierron* (8).

Carbon Co.: Hemlock woods near Moses' Lake, Pocono Mt., August 20, 1863, *Dr. Traill Green* (3, 16); hemlock woods, June, 1867, *Wm. M. Canby* (16).

Blair Co.: 1870, *Miss N. J. Davis* (2).

Chester Co.: West Chester, 1891, *W. W. Jefferis* (2).

MARYLAND, Garrett County

Damp hemlock forest, July 14, 1885, *John Donnell Smith* (16).

VIRGINIA

May, 1838, *S. B. Buckley* (4).

NORTH CAROLINA, Buncombe County

Roandale Farm, July 8, 1895, *A. G. Wetherby* (no. 148) (2).

SOUTH CAROLINA

September, *A. Gray* (?) (3).—*In montibus Carolinæ et Georgiæ*, 1842, *S. B. Buckley* (4).

TENNESSEE

East Tennessee, June, 1870, *C. C. Parry* (2).

WEST VIRGINIA, Preston County

Aurora, 3000 ft., September 9, 1898, *Mr. & Mrs. E. S. Steele* (2).

OHIO, Cuyahoga County

Near Cleveland, *Wm. Krebs* (1).

ILLINOIS, Kane County

Aurora, 1885, *Thomas Boyce* (2). (This may have been collected at Winona, Minn.)

MICHIGAN, Keweenaw County

Clifton, June, 1884, *O. A. Farwell* (11).—Keweenaw Point, 1863, *Dr. Robbins* (no. 25) (4).

Marquette Co.: Thirty-five miles north of Marquette, July 24, 1887, *Wm. Trelease* (4).—In a swamp of Coniferæ, Turin, July 15, 1901, *Bronson Barlow* (1).

WISCONSIN

Pine woods, northern Wisconsin, July, 1883, *Dr. H. E. Hasse* (8).

Door Co.: Ephraim, July 23, 1863, *Lewis Foote* (16).—Mink River, Deathdoor Point, July 26, 1887, *J. H. Schuette* (1).

H. orbiculata MINNESOTA

Rat Lake, July 18, 1891, *F. F. Wood* (2).

Lake Co.: Two Harbors, July 9, 1891, *J. H. Sandberg* (2).

St. Louis Co.: Pine woods, sixteen miles west of Duluth, July, 1889, *Wood* (2).

Beltrami Co.: Swamps, Lake Itasca, June, 1891, *Geo. B. Aiton* (1, 5, 14); July 9, 1891, *Sandberg* (no. 1185) (2).

Cass Co.: "This small form is rather common," Mud Lake, July 24, 1886, *J. C. Arthur, L. H. Bailey, Jr., & E. W. D. Holway* (no. B 377) (3).

Anoka Co.: Centreville, July 30, 1891, *Sandberg* (no. 710) (2).

Martin Co.: Rose Lake, July 13, 1891, *Wood* (8).

MONTANA, Flathead County

Woods near upper Flathead River, July 26, 1883, *Wm. M. Canby* (no. 312) (3).—Deep woods north of Flathead Lake, July 29, 1883, *Canby* (no. 312) (16).—Near Whitefish Lake, August 25, 1892, *R. S. Williams* (no. 920) (1, 2, 5).

IDAHO, Kootenai County

West fork Priest River, alt. 900 m., August 4, 1897, *John B. Leiberg* (no. 2839) (2).—Deep forests, Fourth of July Cañon, alt. 850 m., July 21, 1895, *Leiberg* (no. 1331) (2).—Lake Pend d'Oreille, July 28, 1892, *Sandberg, MacDougal & Heller* (no. 767) (2, 3).

Latah Co.: Janesville, July 24, 1898, *C. V. Piper* (1).

WASHINGTON

Cascade Mts., 49° N. lat., 1859, *Dr. Lyall* (3).—From Fort Colville to Rocky Mts., 1861, *Dr. Lyall* (3).—Puget Sound and interior of the country, 1838–42, Wilkes Expedition (no. 453) (2).—1889, *Geo. R. Vasey*, (no. 80) (2).

Stevens Co.: Rare, Calespell Lake, July 30, 1902, *Frank O. Kreager* (no. 342) (2, 3).

Snohomish Co.: Index, July, 1898, *T. E. Savage, J. E. Cameron & F. E. Lenocker* (4).

King Co.: Snoqualmie, June 4, 1889, *E. C. Smith* (4).—Green River Hot Springs, 1888, *C. V. Piper* (3).

24. **H. macrophylla** *Goldie*, in Edinb. Phil. Journ. 6: 331 (1822); *Hook.*, Exot. Fl. 2: sub t. 145 (1825); *Torr.*, Comp. 318 (1826); *Beck*, Bot. ed. 1, 349 (1833); *Ames*, in Rho. 8: 1, fig. (1906), in Gray's Man. ed. 7, 310 (1908); *Knight*, in Rho. 8: 138 (1906); *Macoun*, in Ottawa Nat. 20: 139 (1906). *H. macrophylla*

Platanthera orbiculata *Lindl.*, Gen. & Sp. Orch. 286 (1835), and of authors in part.

Habenaria orbiculata *Gray*, Man. ed. 5, 501 (1867), and of authors in part, not *H. orbiculata* Hook.

Lysias orbiculata *Rydb.*, in Britton's Man. 294 (1901) in part. — **L. macrophylla** *House*, in Muhlenb. 1: 127 (1906).

"Habenaria *macrophylla*, labello lineari-elongato integerrimo, anthera basi utrinque producta, cornu germine duplo longiore, foliis binis planis elliptico-orbiculatis.

"*Hab.* Moist shady woods, Island of Montreal. Very rare.

"Of all the Orchideous plants which I have seen in North America, this is, without a question, the largest and most striking. It must rank next to *Habenaria orbiculata* (*Orchis* of Pursh and Nuttall), having, like it, two plane, orbicular, approaching to elliptical, *leaves*, which spring from immediately above the fasciculated root, and which, in this plant, are four times as large as those of *H. orbiculata*, measuring from six to eight inches in length, very thin and pellucid, beautifully marked with longitudinal and transverse veins. The *scape* is equally long in proportion, and is furnished with a few lanceolate scales. *Bracteas* similar to these, and shorter than the germen. *Flowers* large, white, resembling those of *H. bifolia*, and arranged in a lax spike of about five or six inches in length. The three *superior petals* are connivent, the *uppermost* is nearly orbicular, the others ovate, attenuated, the *two lateral* ones of the same shape, but much larger, reflexed, their bases decurrent with the *labellum*, which, *H. macrophylla* standing forwards, is linear, as long as the germen, quite entire. *Germen* about an inch in length, slender, tapering down into a footstalk. *Column of fructification* very short. *Anther* large, broad, much like that of *H. bifolia*, but having the base of the cells remarkably apart and elongated into two projecting horns. *Pollen-mass* yellow, with a very long footstalk, and a jointed gland at the base. *Stigma* large, viscid." Goldie, *loc. cit.*

CANADA

Goldie (20), type.

NEWFOUNDLAND

Moist woods, Whitbourne, August 15, 1894, *B. L. Robinson & H. Schrenk* (3, 6).

NEW BRUNSWICK, VICTORIA COUNTY

Moist spruce woods near Clair's, July 11, 1904, *A. A. Eaton* (no. 93) (1).

ONTARIO, MUSKOKA DISTRICT

Shady woods, Muskoka, July 10, 1892, *W. Spreadborough* (6).

MAINE

Northern Maine, *Susan M. Hallowell* (2).

AROOSTOOK Co.: Hilltop, in deciduous woods, Bickerbrook, three miles east of Fort Kent, July 15, 1904, *A. A. Eaton* (1).—Hillside in woods three and a half miles west of Fort Kent, July 18, 1904, *Eaton* (no. 160) (1).—Deep humus of evergreen woods, St. John's Plantation, July 20, 1904, *Eaton* (no. 205, in part) (1).

FRANKLIN Co.: Dark woods, Farmington, July 25, 1902, *Clarence H. Knowlton* (no. 435) (1).—Rich woodland, South Chesterville, July 18. 1903, *Lillian O. Eaton* (1).

OXFORD Co.: Norway, *S. I. Smith* (3).

KENNEBEC Co.: Augusta, July 3, 1886, *E. C. Smith* (4).

YORK Co.: Deep, low woods, North Parsonsfield, June 28, 1902, *R. G. Leavitt* (1); July, 1902, *Leavitt* (1).

NEW HAMPSHIRE, CHESTER COUNTY

Rich woods, Jaffrey, July 9, 1897, *B. L. Robinson* (no. 191) (3).

ROCKINGHAM Co.: Derry, *Seeman* (2).

VERMONT, Addison County *H. macrophylla*
Cold woods, Monkton, July 12 and October 9, 1878, *C. G. Pringle* (7).

MASSACHUSETTS, Essex County
Salisbury, 1895, *A. A. Eaton* (1); low hemlock and pine woods, July 3, 1904, *Eaton* (1).
Middlesex Co.: South Framingham, July 13, 1890, *E. L. Sturtevant* (4). —In open pine woods, North Tewksbury, near Lowell, June 28, 1902, *Oakes & Blanche Ames* (1).
Plymouth Co.: Brockton, July 16, 1903, *O. Ames & A. A. Eaton* (1) (leaves only).

CONNECTICUT, Litchfield County
Pine woods, Norfolk, July 6, 1889, *J. H. Barbour* (4).

NEW YORK
West New York, *A. Gray* (3).
Herkimer Co.: Rich woodlands, Frankfort Hill, six miles south of Utica, June 27, 1903, *Dr. J. V. Haberer* (no. 886) (3).
Washington Co.: Dark woods north end of Podunk Pond, west of Fort Ann, June 26, 1896, *Stewart H. Burnham* (1).
Chenango Co.: Bainbridge, July 20, 1897, *D. LeRoy Topping* (2).

MICHIGAN, Keweenaw County
Rich wood, Keweenaw Point, July 25, 1884, *Frank E. & Floy J. Wood* (2); evergreen woods, infrequent, August, 1890, *O. A. Farwell* (3); woods, 1863, *J. W. Robbins* (3).
Cheboygan Co.: *C. H. Beardslee* (2).

25. **H. cristata** (*Michx.*) *R. Br.*, Prodr. 312 (1810), in Ait. Hort. Kew. ed. 2, 5: 194 (1813); *Spreng.*, Syst. Veg. 3: 690 (1826); *Torr.*, Comp. 317 (1826); *Lodd.*, Bot. Cab. t. 1661 (1832); *Beck*, Bot. ed. 1, 348 (1833); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840); *Darby*, Bot. S. St. 527 (1866); *Gray*, Man. ed. 5, 501 (1867), ed. 6, 508 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 408 (1895); *Willis*, Cat. N. J. 61 (1874); *Britton*, Prel. Cat. N. J. 94 (1881); *Tracy*, Fl. Mo. 84 (1886); *Gattinger*, Tenn. Fl. 83 (1887); *Britton*, Cat. N. J. 234 (1889); *Britton &* *H. cristata*

H. cristata *Br.*, Ill. Fl. 1: 464, f. 1106 (1896); *Kearney*, in Bail. Cycl. Am. Hort. 2: 707 (1900), in Contr. U. S. Nat. Herb. 5: 522 (1901); *Harper*, in Bull. Torr. Bot. Cl. 27: 418 (1900); *Gattinger*, Fl. Tenn. 62 (1901); *Mohr*, Pl. Life Ala. 454 (1901); *Mathews*, Field-book 88 (1902); *Jelliffe*, Gibson's Nat. Orch. 47, t. 22 (1905).

Orchis floribus aureis, spica habitiore congestis: bracteis longitudine floris: labio inferiore nectarii fimbriato capillaceo, seta germine breviore. *Clayt.* n. 688 *Gron.*, Fl. Virg. ed. 1, 184 (1739), ed. 2, 137 (1762).

Orchis psycodes *L.*, Sp. Pl. ed. 1, 943 (1753), ed. 2, 1336 (1763); *Willd.*, Sp. Pl. 4: 40 (1805); *Muhl.*, Cat. 80 (1813); *Elliott*, Sketch 2: 485 (1824). All as to *Gron.*, Fl. Virg. 184.—**O. cristata** *Michx.*, Fl. Bor. Am. 2: 156 (1803); *Willd.*, Sp. Pl. 4: 9 (1805); *Pers.*, Syn. 2: 503 (1807); *Pursh*, Fl. 2: 585 (1814); *Nutt.*, Gen. 2: 188 (1818); *Torr.*, Cat. N. Y. 68 (1819); *Elliott*, Sketch 2: 483 (1824); *Wood*, Class-book ed. 41, 534 (1856). Not *O. cristata* Barton, Comp. Fl. Phil. 2: 133 (1818).

Platanthera cristata *Lindl.*, Gen. & Sp. Orch. 291 (1835); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Gray*, Man. ed. 1, 471 (1848), ed. 2, 445 (1856), ed. 3, 445 (1859); *Beck*, Bot. ed. 2, 348 (1856); *Chapm.*, Fl. S. U. S. ed. 1, 460 (1860), ed. 2, 460 (1884), ed. 3, 486 (1897); *Tatnall*, Cat. Pl. Newc. Co. Del. 75 (1860); *Wood*, Class-book 684 (1861); *Correvon*, Orch. Rust. 169 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 603 (1899). (See Hook., Fl. Bor. Am. 2: 200.)

Blephariglottis cristata *Raf.*, Fl. Tellur. 2: 38 (1836); *Rydb.*, in Britton's Man. 295 (1901); *Small*, Fl. Se. U. S. 313 (1903); *Lighthipe*, in Torreya 3: 80 (1903).

"CRISTATA. O. bulbis indivisis: foliis lanceolatis: spica floribus confertis, parvulis, luteis: cornu dimidii ovarii longitudine:

laciniis duabus interioribus rotundatis, cristato-denticulatis: labello oblongo, pennatim lacero. *H. cristata*

"*Obs.* Affinis *O. ciliari.* Ovarium itidem superne setaceo-attenuatum.

"*Hab.* in sylvis Carolinæ." Michx. *loc. cit.*

NEW JERSEY

New Calverly (3).

Burlington Co.: Swamps, Quaker Bridge, August, 1862, *Canby* (16).

Camden Co.: Winslow, August, 1878, *Isaac C. Martindale* (2).—Griffith's, six and a half miles southeast of Philadelphia, August 10, *C. E. Smith* (3).

Atlantic Co.: Bogs near Egg Harbor City, July 28, 1878, *C. F. Parker* (no. 11,543) (4).

PENNSYLVANIA

T. C. Porter (3).—*Muhlenberg* (13).

DELAWARE

Sussex Cap, July, 1878, *Wm. M. Canby* (8).—Lewiston, July, 1878, *Canby* (3).

Sussex Co.: Meadows, Ellendale, August, 1874, *Canby* (16).—Swamps, Rehoboth, July, 1879, *Canby* (5).—Swamp, one mile south of Lewes, July 27, 1878, *Canby* (16).

MARYLAND

Annandale (?) 1898, *Dr. Gerrit S. Miller* (2).

Baltimore Co.: Baltimore (3).

Worcester Co.: Ocean City, July 25, 1878, *A. Commons* (10, 16).

VIRGINIA, Nansemond County

Near Suffolk, July 11, 1898, *Thos. H. Kearney, Jr.* (no. 1575) (2); July 18, 1898, *Kearney* (no. 1708) (2).

NORTH CAROLINA

In sylvis Carolinæ, florib. luteis, autumnus floret? Hb. Michaux (21), type.

Chowan Co.: Edenton, July 29, 1898, *Thos. H. Kearney, Jr.* (no. 1890) (2).

Wake Co.: Raleigh, September 13, 1897, *W. W. Ashe* (2).

Henderson Co.: Swamps of Muddy Creek, August 20, 1881, *John Donnell Smith* (2, 3).

Craven Co.: Swamps near Newbern, July 21, 1897 (Biltmore Dist. no. 4887a) (2, 3, 4, 5); Newbern, July 31, 1898 (no. 1944), August 1, 1898, (no. 1964), *Thos. H. Kearney, Jr.* (2).

H. cristata Cumberland Co.: Low ground, Fayetteville, August 13, 1903 (Biltmore no. 4887h) (5).

SOUTH CAROLINA, Richland County

Small sphagnum swamp, Columbia, August 1, 1900 (Biltmore no. 4887d) (5).

Aiken Co.: Aiken, August 27, 1866, *W. Ravenell* (4).

Berkeley Co.: Summerville, August, 1893, *J. B.* (5).

Beaufort Co.: Beaufort district, 1886, *Dr. Mellichamp* (10).—Bluffton, 1873, *Mellichamp* (16).

GEORGIA, Dodge County

Moist pine barrens, Eastman, August 7, 1901 (Biltmore no. 4887g) (5).

Sumter Co.: Moist pine barrens, July 26, 1901, *Roland M. Harper* (no. 1122) (2, 3, 4).

Thomas Co.: Thomasville, August 4–14, 1903, *Mrs. A. P. Taylor* (1); July 18, 1905, *Mrs. Taylor* (1).

FLORIDA

Chapman (2, 4, 5, 8, 16).

Duval Co.: August, 1876, *A. H. Curtiss* (7).—Moist pine barrens near Jacksonville, August, 1877, *Curtiss* (no. 2758) (2, 4, 6, 8); August 6, 1894, *Curtiss* (no. 5120) (14).—San Pablo, July 25, 1896, *L. H. Lighthipe* (no. 440) (5).

Madison Co.: Damp, dark, fertile hammock woods near a pond, August 2, 1898, *Combs* (2).

Gadsden Co.: Quincy, September 4, 1895, *Geo. V. Nash* (no. 2560) (2, 3, 4).

Washington Co.: Swamps, Point Washington, August 10, 1901 (Biltmore no. 4887 f) (5).

St. John Co.: St. Augustine, 1877, *Mary C. Reynolds* (8).

Hernando Co.: June–July, 1898, *A. S. Hitchcock* (4).

Orange Co.: Oviedo, July, 1904, *T. L. Mead* (1).—Sanford, July 29, 1895, *Nash* (no. 2274) (10).

ALABAMA, Cullman County

Cullman, August 5, 1896, *Chas. Mohr* (12).

Tuscaloosa Co.: Low grassy pine barrens, June, *E. A. Smith* (12).—Wet soil, Tuscaloosa, August 1, 1899 (Biltmore no. 4887b) (5).

Clay Co.: August 24, 1897, *F. S. Earle* (14).

Lee Co.: Auburn, August 11, 1897, *F. S. Earle & C. F. Baker* (no. 739) (4, 14). *H. cristata*

Butler Co.: In swamps near Greenville, August 11, 1899 (Biltmore no. 4887c) (5).

Mobile Co.: Mobile, 1872, *Wm. Harvey* (no. 39) (2); July 21, 1905, *W. C. Dukes* (1).—Common in swamp, Spring Mill, August 1, 1897, *B. F. Bush* (no. 87) (2, 4).

MISSISSIPPI, Harrison County

Biloxi, July 26, 1896, *C. L. Pollard* (no. 1038) (2, 3, 4, 5).—July 29, 1899, *S. M. Tracy* (no. 6080) (5).—July 23, 1897, *C. F. Baker* (14).

Hancock Co.: July 28, 1887, *H. V. Arnx* (4).

TENNESSEE, Putnam County

Swampy ground, August 8, 1900 (Biltmore no. 4887e) (5).

Coffee Co.: Tullahoma, August, 1878, *Dr. A. Gattinger* (7).

Franklin Co.: Sewanee, August 1, 1878, *Gattinger* (8).

ARKANSAS, Pulaski County

Little Rock, July, 1885 (11).

LOUISIANA

Hale (3).—Paroisse des Rapides, 1839, *Prof. Steinhauer* (4).—Aldenbridge, November 1, 1898, *Wm. Trelease* (4).

× **H. Chapmanii** (*Small*) comb. nov. (*H. ciliaris* × *H. cristata*). × *H. Chapmanii*

Blephariglottis Chapmanii *Small*, Fl. Se. U. S. 314 (1903).

"Roots coarse; stems 6–10 dm. tall: leaves few; blades broadly linear to linear-lanceolate, 1–2 dm. long or shorter above, acute, the lower ones with clasping bases, the upper reduced to sessile bracts: spikes cylindric, about 1 dm. long, 4 cm. thick, many-flowered: perianth deep orange: sepals about 4 mm. long, the lateral suborbicular, the other concave, often notched at the apex: lateral petals fan-shaped, 3.5–4 mm. long, pectinate-fringed: lip about 1 cm. long, the body linear, with a terminal drooping fringe of 6–8 simple or forking hair-like appendages and 2 basal stag-horn-like forking appendages: spur as long as the ovary or longer.

× *H. Chapmanii* “In pine woods, Apalachicola, Florida, Summer.” Small, *loc. cit.*

FLORIDA, FRANKLIN COUNTY

Low pine woods near Apalachicola, 1868, *Dr. Saurman* (4, 5); *Chapman* (5); 1882, *Chapman* (3).

DUVAL Co.: Moist pine barrens near Jacksonville, August, *A. H. Curtiss* (no. 2758) (3); August 6, 1894, *Curtiss* (no. 5120) (2).

H. ciliaris 26. **H. ciliaris** (*L.*) *R. Br.*, Prodr. 312 (1810), in Ait. Hort. Kew. ed. 2, 5: 194 (1813), Miscellaneous Bot. 2: 477; *Sims*, Bot. Mag. t. 1668 (1814); *Lindl.*, in Donn's Hort. Cant. ed. 10, 332 (1823); *Torr.*, Comp. 317 (1826); *Spreng.*, Syst. Veg. 3: 690 (1826); *Lodd.*, Bot. Cab. t. 1326 (1832); *Short*, Cat. Ky. 7 (1833); *Beck*, Bot. ed. 1, 348 (1833); *Gray*, in Ann. Lyc. Nat. Hist. N. Y. 3: 230 (1836); *Darl.*, Fl. Cestr. ed. 1, 507 (1837); *Eaton & Wr.*, N. A. Bot. ed. 8, 259 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Dewey*, Herbaceous Pl. Mass. 198 (1840); *Darby*, Bot. S. St. 526 (1866); *Gray*, Man. ed. 5, 502 (1867), ed. 6, 509 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 408 (1895); *Willis*, Cat. N. J. 61 (1874); Yale Cat. 45 (1878); *J. Robinson*, Fl. Essex Co. 108 (1880); Gard. Chron. n. s. 14: 305 (1880); *Ward*, Fl. Wash. 119 (1881); *Britton*, Prel. Cat. N. J. 94 (1881); *Perkins*, Gen. Cat. Vt. 37 (1882); *Galen*, Fl. Lanc. Co. (1884), (1895), 15 (1898); *Gattinger*, Tenn. Fl. 83 (1887); *Macoun*, Cat. 4: 18 (1888); *Dame & Collins*, Fl. Middlesex 103 (1888); *Bennett*, Pl. R. I. 43 (1888); *Perkins*, Fl. Vt. 278 (1888); *Britton*, Cat. N. J. 234 (1889); *Macoun*, Check-list 53 (1889); *Watson*, Orch. Cult. ed. 1, 527 (1890), ed. 2, 527 (1895); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Morong*, in Bull. Torr. Bot. Cl. 20: 36 (1893); *Williams*, Orch. Grow. Man. ed. 7, 417 (1894); *Baldw.*, Orch. N. Eng. 90, 113–115, f. 35 (1894);

Moran, in Journ. des Orch. 6: 254 (1895); *Britton & Br.*, Ill. Fl. 1: 464, f. 1167 (1896); *Millsp. & Nutt.*, Fl. W. Va. 200 (1896); *Kearney*, in Bail. Cycl. Am. Hort. 2: 706, f. 1015 (1900); *Meehan*, Monthly 10: 17, t. 2 (1900); *Gattinger*, Fl. Tenn. 62 (1901); *Mohr*, Pl. Life Ala. 454 (1901); *Mathews*, Field-book 88, fig. (1902); *Jelliffe*, Gibson's Nat. Orch. 47, t. 28 & frontisp. (1905); *Harper*, in Rho. 7: 78 (1905). *H. ciliaris*

Orchis Marilandica, grandis & procera, floribus luteis, calcari longissimo, labello fimbriato *Ray*, Suppl. 588 (1704). —**O. palmata elegans lutea Virginiana cum longis calcaribus luteis** *Mor.*, Hist. 3: 499 (1715).—**O. nectarii labio lanceolato ciliato, seta germine intorto longiore** *Roy.*, Lugdb. 15 (1729).—**O. bulbis indivisis, nectarii labio lanceolato ciliato cornu longissimo** *L.*, in Act. Ups. 6 (1741).

Orchis ciliaris *L.*, Sp. Pl. ed. 1, 939 (1753) (excl. syn. *Gron.*, Fl. Virg.), ed. 2, 1331 (1763); *Forst.*, Cat. Pl. N. A. 39 (1771); *Walt.*, Fl. Carol. 280 (1788); *Muhl.*, Ind. Fl. Lanc. 178 (1793); *Salisb.*, Prodr. 6 (1796); *Poir.*, in Lam. Encyc. 4: 588 (1797); *Andrews*, Bot. Repos. 1: 42, t. 42 (1797); *Sw.*, in Act. Holm. 21: 206 (1800); *Willd.*, Sp. Pl. 4: 8 (1805); *Sw.*, Gen. et Sp. Orch. (Schrader's Neues Journ. 1) 8 (1806); *Pers.*, Syn. 2: 502 (1807); *Martyn*, in Mill. Dict. ed. 9, 2: no. 14 (1807); *Pursh*, Fl. 2: 585 (1814); *Green*, Cat. N. Y. 120 (1814); *Barton*, Comp. Fl. Phil. 2: 186 (1818); *Nutt.*, Gen. 2: 188 (1818); *Torr.*, Cat. N. Y. 68 (1819); *Elliott*, Sketch 2: 488 (1824); *Big.*, Fl. Bost. ed. 2, 319 (1824), ed. 3, 341 (1840); *Eaton*, Man. ed. 4, 374 (1824); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 41, 584 (1856); *Provanch.*, Fl. Canad. 2: 567 (1862).—**O. Floridana, flore aureo fimbriato longis calcaribus donato** *Pluk.*, Amalth. ed. 2, 162, t. 432, f. 5 (1769).

Platanthera ciliaris *Lindl.*, Gen. & Sp. Orch. 292 (1835);

H. ciliaris *Hook.*, Fl. Bor. Am. 2: 199 (1839); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Torr.*, Fl. N. Y. 2: 277 (1843); *Gray*, Man. ed. 1, 471 (1848), ed. 2, 446 (1856), ed. 3, 446 (1859); *Darl.*, Fl. Cestr. ed. 3, 311 (1853); *Beck*, Bot. ed. 2, 348 (1856); *Chapm.*, Fl. S. U. S. ed. 1, 460 (1860), ed. 2, 460 (1884), ed. 3, 486 (1897); *Tatnall*, Cat. Pl. Newc. Co. Del. 75 (1860); *Wood*, Class-book 684 (1861); *Paine*, Pl. Oneida Co. 84 (1865); *Wood & McCarthy*, Wilmington Fl. 50 (1887); *Correvon*, Orch. Rust. 168, f. 32 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 604 (1899).

Blephariglottis flaviflora *Raf.*, Fl. Tellur. 2: 38 (1836).—**B. ciliaris** *Rydb.*, in Britton's Man. 296 (1901); *Burnham*, in Torreya 1: 119 (1901); *Small*, in Porter's Fl. Pa. 93 (1903), Fl. Se. U. S. 314 (1903); *House*, in Torreya 3: 52 (1903); *Lighthipe*, in Torreya 3: 80 (1903).

"ORCHIS bulbis indivisis, nectarii labio lanceolato ciliato: cornu longissimo. *Act. ups.* 1741. *p.* 6.

"Orchis nectarii labio lanceolato ciliato, seta germine intorto longiore. *Roy. lugdb.* 15. *Gron. virg.* 183.

"Orchis palmata elegans lutea americana, cum longis calcaribus luteis. *Moris. hist.* 3, *p.* 499.

"Orchis marilandica grandis & procera, floribus luteis, calcari longissimo: lobulo fimbriato. *Raj. suppl.* 588.

"*Habitat in* Virginia, Canada. ♃." L. *loc. cit.*

In Catesby's Herbarium, preserved at the British Museum of Natural History, there is a very good specimen of this species together with two other specimens of the genus, probably *H. nivea* and *H. repens.* In the Gronovian Herbarium there is a specimen which has been identified as *Habenaria ciliaris* R. Br., accompanied by the following description: "*Orchis nectarii labio lanceolato ciliato, seta germine intorto longiore.*" Probably Gronovius confused two species in his work on the flora of Virginia.

H. ciliaris

H. ciliaris is very rare in the northernmost part of its range. With the exception of one collection from Vermont, which I refer to *H. ciliaris* with reasonable sureness, the species has not been reported from the United States north of Massachusetts. In the southernmost part of its range great variation may be expected, especially in the size of the raceme and the fringe of the labellum.

ONTARIO, Essex County
Low sandy woods, Leamington, August 15, 1886, *Burgess* (6); in a swamp west of Leamington, July 24 and 25, 1892, *J. Macoun* (3, 6).

VERMONT, Orleans County
Troy, 1841, *John Carey* (4).

MASSACHUSETTS, Middlesex County
Lexington, 1852, *W. Boot* (3).
Norfolk Co.: Dedham, August, 1888, *E. H. Hitchings* (3).—West Dedham, August 9, 1888, *Faxon* (2).
Nantucket Co.: Nantucket, August 1897, *L. L. Dame* (3).

RHODE ISLAND, Washington County
South Kingston, August 26, 1880, *Faxon* (3); August 24, 1881, *Faxon* (3); July 27, 1878, *J. W. Congdon* (4).
Providence Co.: Damp woods, Burrillville, September, 1902, *Leland J. Spalding* (17).—Foster, August, 1878, *Dennis Tonery* (1).

CONNECTICUT, New Haven County
New Haven, August, 1830, *S. B. Buckley* (4).—East Haven, near New Haven, July 31, 1886, *A. L. Winton* (3); open swamp, rare, August 15, 1903, *E. B. Harger* (1); August, *H. M. Denslow* (2).—Branford, August 2, 1897, *Wm. Trelease* (4).
Fairfield Co.: Dry rich field, abundant locally, August 22, 1895, *E. H. Eames* (2).—Dry copse on coast, Stratford, September 27, 1903, *Eames* (1).

NEW YORK
Sartwell (3).
Washington Co.: East Greenwich, 1865, *Dr. Asa Fitch* (11).
Seneca Co.: North of Newton's Pond, Junius, August 4, 1893, *Jos. Schrenk* (4).

H. ciliaris Richmond Co.: South Beach, Staten Isl., August 3, 1890, *Mrs. E. G. Britton* (6).—Erastina, July 25, 1894, *C. L. Pollard* (2).

NEW JERSEY

Swamps, July, 1863, *Wm. M. Canby* (6).—August, 1842, *Thos. P. James* (2).—*Thurber* (3).—*Durand* (3).

Hudson Co.: *Circa Hoboken in Canada, lecta 1828, C. J. Moser* (10).

Camden Co.: Low ground, July 30, 1871, *C. F. Parker* (3).

Gloucester Co.: Harrisonville, August, 1874, *H. H. Rusby* (10).

PENNSYLVANIA, Center County

Mt. Eagle, July, 1895, *Miss C.* (4).—Bear Meadows, August, 1865, *Miss N. J. Davis* (2).

Huntington Co.: August 14, 1856, *T. C. Porter* (3).

Berks Co.: Monterey, August, 1891, *K. A. Taylor* (2).

Lebanon Co.: Vicinity of Penryn, July 29, 1889, *J. K. Small* (6); September 13, 1892, *A. A. Heller* (no. 680) (2, 4).

Bucks Co.: Low ground, Bristol, July 30, 1865, *C. F. Parker* (2, 4, 5).

Philadelphia Co.: August, 1847, *Thos. P. James* (2).

DELAWARE

Swamps, July, 1863, *Wm. M. Canby* (6).

Newcastle Co.: Swamps, Townsend, August, 1862, *Canby* (16).

MARYLAND, Baltimore County

Near Baltimore, September, 1893, *Adam Steitz* (2); fruit, October 11, 1894, *Steitz* (2).—Near Hill's, fruit, South Baltimore, November 4, 1893 *Steitz* (2); July 25, 1896, *Steitz* (2).

Prince George Co.: Laurel, August 7, 1897, *F. H. Knowlton* (2, 5).

Worcester Co.: Meadows, Ocean City, August 8, 1878, *Wm. M. Canby* (16).

DISTRICT OF COLUMBIA

July, 1887, *C. D. White* (2); August 8, 1897, *Thos. H. Kearney, Jr.* (5).—Mucky ground, August 6 and 12, 1896, *E. S. Steele* (3, 4).—Near Reform School, July 21, 1878, *Lester F. Ward* (2).—Kenilworth Swamp, August 4, 1897, *Steele* (2).—August 8, 1897, *Kearney* (5, 14).—Benning's, August 15, 1897, *C. L. Pollard* (2).

VIRGINIA

Dry hills, mountains of Virginia, August, 1858, *Wm. M. Canby* (16).

Augusta Co.: Mt. Roger, 2000–4473 ft., August 9, 1893, *A. A. Heller & E. Gertrude Halback* (no. 1139) (2).

Craig Co.: Craig's, 600 metres, August 22, 1903, *E. S. Steele & Mrs. Steele* (no. 75) (3, 4).

Nansemond Co.: About Suffolk, July 24, 1893, *Heller* (no. 1139) (3).

NORTH CAROLINA

Middle North Carolina, *W. W. Ashe* (2); August 14, 1884, *G. McCarthy* (2); 1885, *McCarthy* (2).

Watauga Co.: Blowing Rock, August 9, 1893, *Mrs. B. L. Robinson* (3).

Buncombe Co.: Moist woodland, Biltmore, August 5, 1896 (Biltmore no. 489) (5); dry woods, August 13, 1897 (Biltmore no. 489b) (2, 3, 4, 5).

Cleveland Co.: Base of King's Mt., August 1, 1902 (Biltmore no. 489e) (5).

Polk Co.: Spring Mountain Park, near Columbus, August 16, 1897, *E. C. Townsend* (2).

Swain Co.: Dry hillsides, Great Smoky Mts., 1700–4000 ft., July 15–August 15, 1891, *Beardslee & Kofoid* (2, 4).

Henderson Co.: Flat Rock, *L. Gibbs* (3).—Swamps of Muddy Creek, August 20, 1881, *J. D. Smith* (3).

New Hanover Co.: Wilmington, 1881, *W. R. Smith* (2).

SOUTH CAROLINA, Lexington County

Moist soil, Batesburg, July 30, 1900 (Biltmore no. 489d) (5).

Aiken Co.: Aiken, August, 1869, *H. W. R[avenell]* (2); August 16, 1866, *H. W. R.* (4).

Beaufort Co.: Bluffton, 1872, *Dr. Mellichamp* (4); 1873, *Mellichamp* (16).

GEORGIA, Floyd County

Rome, July, 1888, *Gerald McCarthy* (2).

Richmond Co.: Augusta, August, 1876, *A. Cuthbert* (10).

Screven Co.: Scarborough, September, 1884, *E. W. Lang* (10).

Sumter Co.: Rather dry pine barrens, July 24, 1901, *R. M. Harper* (no. 1108) (2, 3, 4).

North Co.: Poulan, August 14 and 15, 1900, *C. L. Pollard & W. R. Maxon* (no. 552) (2).

Colquitt Co.: Sphagnous bog along Ochlocknee Creek, near Moultrie, August 22, 1903, *R. M. Harper* (no. 1943) (1).

Thomas Co.: Thomasville, August 21, 1897, *S. M. Tracy* (no. 3535) (2, 4, 14); July 6, 1902, August 4, 25, September 1, 1903, July 18, 1905, *Mrs. A. P. Taylor* (1).

H. ciliaris FLORIDA

East Florida, *Dr. Edward Palmer* (no. 546) (2, 3).

Walton Co.: De Funiak, July, 1896, *P. H. Rolfs* (no. 692) (4); marsh lands along streams, mostly in open places, common, August 12, 1898, *Combs* (2).

Calhoun Co.: Swamps and bogs, Wewahitchka, August, 1896, *Chapman* (Biltmore no. 489a) (2, 3, 5).

St. John Co.: St. Augustine, May 20, 1886, *Mary C. Reynolds* (2).

Lake Co.: Flat woods, Eustis, August 1–15, 1894, *George V. Nash* (no. 1534) (2, 3, 4, 5, 10, 14).

Manatee Co.: Pine barrens, Manatee, August 3, 1890, *J. H. Simpson* (14).

ALABAMA

Prof. Alexander Winchell (2).

Talladega Co.: Talladega Springs, July 17–19, 1900, *C. L. Pollard & W. R. Maxon* (no. 244) (2).

Tuscaloosa Co.: Wet borders of streams, common, Tuscaloosa, July 31, 1878, *E. A. Smith* (12).

Tallapoosa Co.: August 21, 1897, *F. S. Earle* (14).

Coosa Co.: Low ground, Goodwater, July 31, 1902 (Biltmore no. 489f) (5).

Lee Co.: Auburn, August 15, 1897, *Earle & Baker* (4, 14).

Mobile Co. (?): Common in swamp, Spring Hill, August 4, 1897, *B. F. Bush* (no. 91) (4).

MISSISSIPPI, Jackson County

Scranton, August 5 and 6, 1896, *C. L. Pollard* (no. 1194) (2, 3, 4, 5).

Harrison Co.: Ocean Springs, August 2, 1889, *F. S. Earle* (1); August 1, 1895, *J. Skehan* (4).—Biloxi, July 25 and 26, 1896, *Pollard* (no. 1025) (2, 3, 4); August 3, 1900, *S. M. Tracy* (no. 7013) (5).

TENNESSEE

Near summit of Great Smoky Mts., 1895, *Frank E. Moore* (2).

Dickson Co.: Pond Station, July 23, 1886, *A. Gattinger* (8).—Craggy Hope, August 10, 1882, *Gattinger* (8).

Lincoln Co.: Low ground in oak barrens, Elora, July 27, 1899 (Biltmore no. 489c) (5).

Coffee Co.: Tullahoma, *A. Gattinger* (5, 8); August, 1878, *Gattinger* (7).—Sewanee, August, 1878, *Gattinger* (8).

Monroe Co.: White Cliff Springs, July, 1890, *F. Lamson-Scribner* (8).

H. ciliaris

Cocke Co.: Within three miles of Wolf Creek Station, August 30, 1897, *Thos. H. Kearney, Jr.* (no. 909) (2, 4, 14).

OHIO, Lucas County

Ten miles west of Toledo, August 1, 1898, *E. L. Moseley* (2).

INDIANA, Steuben County

Low open clearing one-half mile north of Clear Lake, July 24, 1904, *Chas. C. Deam* (1); prairie conditions around Clear Lake, August 21, 1904, *Deam* (1). Lake Co.: Swales, Miller's, August 13, 1897, *L. M. Umbach* (2, 5).—Gibson's, August, 1870, *Henry H. Babcock* (4).

ILLINOIS

July, 1874, *H. H. Babcock* (2, 7).

MICHIGAN

Whitmore Lake, August, 1857, *Fritchey* (4).

Ingham Co.: Cold swamps, Lansing, September 1, 1883, *L. H. Bailey, Jr.* (3).—Agricultural College, July 28, 1890, *G. H. Hicks* (3).—Towar's Swamp, near Agricultural College, July 23, 1894, *F. Wheeler* (?) (11).

MISSOURI, Ripley County

Rare dry pine woods five miles north of Pleasantgrove, July 25, 1897, *K. K. MacKenzie* (no. 425) (4).

ARKANSAS

Swamps, southwest Arkansas, August, *F. L. Harvey* (no. 76) (4, 10, 11, 16).

Pulaski Co.: Little Rock, June, 1885 (11); July, 1886, *Dr. H. E. Hasse* (2).

Garland Co.: Springy places, Hot Springs, August, 1879, *G. W. Letterman* (4); August, 1904, *Miss E. A. Douglas* (4).

LOUISIANA

Red River, *Hale* (?) (3).

TEXAS, Harding County

Long-leaf pine belt, July, 1884, *G. C. Neally* (3).

× *H. Canbyi*

× H. Canbyi *Ames*, in Rho. 10: 70 (1908), in Gray's Man. ed. 7, 310 (1908). (*H. blephariglottis* × *H. cristata.*)

Labellum about 7 mm. long, deeply fringed, more closely resembling *H. cristata* than *H. blephariglottis; spur* 12 mm. long, more or less intermediate between the parent species. The length of the spur is of great value in the identification of the hybrid.

× *H. Canbyi* DELAWARE, SUSSEX COUNTY

"*Habenaria cristata* × *blephariglottis?* Intermediate in color, size of flowers, openness of panicle, &c., between the two species." Swamp near Lewes, Delaware, in company with *H. cristata* and *H. blephariglottis*, July 27, 1878, *Wm. M. Canby* (16).

H. blephariglottis 27. **H. blephariglottis** *Hook.*,[1] Exot. Fl. 2: t. 87 (1824); *Lodd.*, Bot. Cab. t. 925 (1824); *Spreng.*, Syst. Veg. 3: 690 (1826); *Torr.*, Comp. 317 (1826); *Sw.*, Adnot. Bot. 46 (1829); *Beck*, Bot. ed. 1, 348 (1833); *Gray*, in Ann. Lyc. Nat. Hist. N. Y. 3: 230 (1836); *Paxt.*, Mag. 2: 183 (1836); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Eaton & Wr.*, N. A. Bot. ed. 8, 259 (1840); *Dewey*, Herbaceous Pl. Mass. 198 (1840); *Darby*, Bot. S. St. 527 (1866); *Gray*, Man. ed. 5, 502 (1867), ed. 6, 509 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 408 (1895); *Miller & Young*, Pl. Suffolk Co. L. I. 13 (1874); *Willis*, Cat. N. J. 61 (1874); Yale Cat. 45 (1878); *J. Robinson*, Fl. Essex Co. 108 (1880); *Britton*, Prel. Cat. N. J. 94 (1881); *Perkins*, Gen. Cat. Vt. 37 (1882); *Dudley*, Cayuga Fl. 96 (1886); *Gattinger*, Tenn. Fl. 83 (1887); *Macoun*, Cat. 4: 19 (1888); *Owen*, Pl. Nantucket 58 (1888); *Bennett*, Pl. R. I. 43 (1888); *Dame & Collins*, Fl. Middlesex 103 (1888); *Perkins*, Fl. Vt. 278 (1888); *Macoun*, Check-list 53 (1889); *Britton*, Cat. N. J. 235 (1889); *Watson*, Orch. Cult. ed. 1, 528 (1890), ed. 2, 528 (1895); *Beal & Wheeler*, Fl. Mich. 607 (1891); *Fernald*, in Portl. Cat. 64 (1892); *Williams*, Orch. Grow. Man. ed. 7, 417 (1894); *Baldw.*, Orch. N. Eng. 113–115 (1894); *Moran*, in Journ. des Orch. 6: 254 (1895); *Britton & Br.*, Ill. Fl. 1: 465 f. 1108 (1896); *Deane*, Fl. Met. Park 79 (1896); *Creevey*, Fl.

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[1] Hooker bases his species on *Orchis blephariglottis* Willd., but he figures the form which was later segregated by Lindley as *Platanthera holopetala*. The consensus of opinion of those who have done close field-work is that var. *holopetala* is untenable, all conditions of petals from entire to fringed sometimes being found on the same spike. See *Bulletin of the Torrey Botanical Club* 20: 86. Niles, in *Bog-trotting for Orchids*, designated a yellowish form as var. *holopetala*. (A. A. E.)

Field, Hill & Swamp 80 (1898); *Clute,* Fl. Up. Susq. 106 (1898); *Meehan,* Monthly 8: 113, t. 8 (1898); *Kearney,* in Bail. Cycl. Am. Hort. 2: 707 (1900), in Contr. U. S. Nat. Herb. 5: 522 (1901); *Brainerd, Jones & Eggleston,* Fl. Vt. 30 (1900); *Gattinger,* Fl. Tenn. 62 (1901); *Mohr,* Pl. Life Ala. 454 (1901); *Mathews,* Field-book 88, 90 (1902); *Jelliffe,* Gibson's Nat. Orch. 51, t. 24 (1905); *Harper,* in Rho. 7: 78 (1905). *H. blephariglottis*

Orchis nectarii labio lanceolato ciliato, seta germine intorto longiore *Gron.,* Fl. Virg. ed. 1, 183 (1739) (according to Gray), ed. 2, 136 (1762).

Orchis ciliaris *L.,* Sp. Pl. ed. 1, 939 (1753), &c., as to *Gron.,* Fl. Virg.—**O. testiculata floribus niveis, &c.** *Clayt.* n. 560 *Gron.,* Fl. Virg. ed. 1, 183 (1739), ed. 2, 136 (1762).—**O. ciliaris** VAR. **alba** *Michx.,* Fl. Bor. Am. 2: 156 (1803).—**O. blephariglottis** *Willd.,* Sp. Pl. 4: 9 (1805); *Pers.,* Syn. 2: 502 (1807); *Pursh,* Fl. 2: 585 (1814); *Green,* Cat. N. Y. 120 (1814); *Barton,* Comp. Fl. Phil. 2: 136 (1818); *Nutt.,* Gen. 2: 188 (1818); *Big.,* Fl. Bost. ed. 2, 318 (1824), ed. 3, 340 (1840); *Eaton,* Man. ed. 4, 374 (1824); *Elliott,* Sketch 2: 483 (1824); *Oakes,* in Thompson's Vt. 199 (1853); *Wood,* Class-book ed. 41, 534 (1856); *Provanch.,* Fl. Canad. 2: 567 (1862).

Platanthera blephariglottis *Lindl.,* Gen. & Sp. Orch. 291 (1835); *Hook.,* Fl. Bor. Am. 2: 199 (1839); *Steud.,* Nomencl. ed. 2, 2: 351 (1841); *Torr.,* Fl. N. Y. 2: 277 (1843); *Gray,* Man. ed. 1, 472 (1848), ed. 2, 446 (1856), ed. 3, 446 (1859); *Darrach,* Pl. Phil. 13 (1853); *Beck.,* Bot. ed. 2, 347 (1856); *Tatnall,* Cat. Pl. Newc. Co. Del. 75 (1860); *Hervey,* Cat. 21 (1860); *Wood,* Class-book 684 (1861); *Paine,* Pl. Oneida Co. 84 (1865); Portl. Cat. 7 (1868); *Wood & McCarthy,* Wilmington Fl. 50 (1887); *Tracy,* Essex Fl. 81 (1892); *Correvon,* Orch. Rust. 166 (1893); *Chapm.,* Fl. S. U. S. ed. 3, 486 (1897); *Kränzl.,* Orch. Gen. et

H. blephariglottis Sp. 1: 604 (1899), 989 (1901).—**P. holopetala** *Lindl.*, Gen. & Sp. Orch. 291 (1835); *Hook.*, Fl. Bor. Am. 2: 199 (1839); *Steud.*, Nomencl. ed. 2, 2: 351 (1841).—**P. ciliaris** *Lindl.*, Gen. & Sp. Orch. 292 (1835); *Hook.*, Fl. Bor. Am. 2: 199 (1839).

Blephariglottis albiflora *Raf.*, Fl. Tellur. 2: 38 (1836).—**B. bicolor** *Raf.*, Fl. Tellur. 2: 38 (1836).

Platanthera blephariglottis VAR. **holopetala** *Torr.*, Fl. N. Y. 2: 277 (1843); *Gray*, Man. ed. 1, 472 (1848), ed. 2, 446 (1856), ed. 3, 446 (1859); *Paine*, Pl. Oneida Co. 84 (1865).—**P. ciliaris** VAR. **blephariglottis** *Chapm.*, Fl. S. U. S. ed. 1, 460 (1860), ed. 2, 460 (1884).

Habenaria blephariglottis VAR. **holopetala** *Gray*, Man. ed. 5, 502 (1867), ed. 6, 509 (1890); *Day*, Pl. Buffalo 139 (1882); *Upham*, Fl. Minn. 140 (1884); *Owen*, Pl. Nantucket 58 (1888); *Bennett*, Pl. R. I. 48 (1888); *Fernald*, in Portl. Cat. 64 (1892); *Britton & Br.*, Ill. Fl. 1: 465 (1896).—**H. ciliaris** VAR. **alba** *Morong*, in Bull. Torr. Bot. Cl. 20: 38 (1893).—**H. ciliaris** VAR. **holopetala** *Morong*, in Bull. Torr. Bot. Cl. 20: 38 (1893).—**H. ciliaris** VAR. **albiflora** *Gower*, ex Williams Orch. Grow. Man. ed. 7, 417 (1894).

Blephariglottis blephariglottis *Rydb.*, in Britton's Man. 296 (1901); *Small*, Fl. Se. U. S. 318 (1903), in Porter's Fl. Pa. 93 (1903); *House*, in Torreya 3: 52 (1903); *Lighthipe*, in Torreya 3: 80 (1903); *C. B. Robinson*, in Torreya 5: 15 (1904); *House*, in Bull. Torr. Bot. Cl. 32: 376 (1905); *C. B. Robinson*, in Bull. Pictou Acad. 1: 35 (1907).

Habenaria holopetala *Niles*, Bog-trotting for Orchids 256 (1904), based on a cream-colored form.

It is often difficult to distinguish between this species and *H. ciliaris* when herbarium specimens are studied. Usually the fringe of the labellum is shorter in *H. blephariglottis* than in *H. ciliaris*.

H. blephariglottis

The limb of the labellum in *H. ciliaris* is usually narrowly oblong, the basal segments of the fringe branching in a conspicuous manner.

NEWFOUNDLAND

Sphagnous soil, hillside, Channel, July 27–August 1, 1901, *C. D. Howe & W. F. Lang* (no. 895) (3).—Salmonier, August, 1885, *R. Thaxter* (3).—Marsh, Holyrood, August 23, 1894, *B. L. Robinson & H. Schrenk* (no. 111) (2, 3, 4, 6, 7).

NOVA SCOTIA

Marshes, summit of Smoky Mt., Cape Breton Isl., August 3, 1898, *J. Macoun* (6).

Pictou Co.: Bogs, August, 1885, *Robert* (6).

Guysboro Co.: Canso, August 8, 1901, *J. Fowler* (1).

PRINCE EDWARD ISLAND

Boggy ground, Mt. Stewart, August 17, 1888, *J. Macoun* (2, 3, 6).

NEW BRUNSWICK, Northumberland County

Little Miramichi River, August 11, 1892, *J. Fowler* (2); July 18, 1892, *Fowler* (4).

ONTARIO, Nipissing District

In a peat bog, Catfish Lake, July 21, 1900, *J. Macoun* (6).

Muskoka Dist.: Peat bogs, Muskoka, July 11, 1892, *Spreadborough* (6); mossy borders of lakes, Muskoka, August, 1881, *Burgess* (6).—Gravenhurst, July 29, 1897 (Biltmore, no. 4966 c) (5).

Carleton Co.: In peat bogs and swamps, Mer Bleue, near Ottawa, July 28, 1879, *Fletcher* (6).

MAINE, Penobscot County

Orono, 1882, *Mrs. C. H. Fernald* (2); Bangor bog, Orono, July 27, 1895, *M. L. Fernald* (no. 351) (2, 3, 4); peat bogs, July 21, 1890, *Fernald* (3).

Franklin Co.: Sphagnum bog, South Chesterville, July 18, 1903, *Lillian O. Eaton* (1).—Peat bog, Chesterville, July 19, 1902, *C. H. Knowlton* (1).

VERMONT

Island Pond, July 25, 1861, *Wm. Boott* (3).

MASSACHUSETTS, Middlesex County

Big Grassy Pond, Acton, August 9, 1888, *Walter Deane* (3).

H. blephariglottis

Norfolk Co.: Avon, July 27 and October 4, 1901, *R. G. Leavitt* (5).—Readville, July 28, 1870, *Wm. Boott* (3).

Bristol Co.: North Easton, August 6, 1902, *R. M. Grey* (1); August 1, 1903, *A. A. Eaton* (1); July, 1903, *Eaton* (1).—Nonquit, July 19, 1889, *Miss Cook* (4).

Plymouth Co.: Marion, August 7, 1891, *Faxon* (3).

Barnstable Co.: Pocasset, July, 1883, *Miss E. Minot* (3).—South Dennis, August, 1879, *C. N. Brainerd* (5, 7).

Nantucket Co.: Nantucket, August, 1878, *P. S. Collins* (6); August, 1897, *L. L. Dame* (3).

RHODE ISLAND, Providence County

Swamps, Providence, July, 1846, *Geo. Thurber* (3).—North Scituate, August 3, 1878, *W. W. Bailey & Mrs. Esten* (1).

Washington Co.: South Kingston, July 27, 1878, *J. W. Congdon* (7).

NEW YORK

Long Isl., August 9, 1858, *R. Veitch* (4).

Jefferson Co.: Sphagnum swamp about a mile below Ludlow Pond, Smithville, August 2, 1884, *F. V. Coville* (2).

Warren Co.: Peat marsh north of Glen Lake, July 27, 1899, *Stewart H. Burnham* (1).

Oneida Co.: Sphagnous swamps, Utica, *A. Gray* (3).

Onondaga Co.: Near Syracuse, *T. M. Fry* (1).

Madison Co.: Fiddler's Green, July 13, 1905, *H. D. House* (no. 1246) (1).

Seneca Co.: Tamarack swamp, West Junius, August 4, 1873, *Schrenk* (4).—Penn Yan, *Sartwell* (4).

Suffolk Co.: Sayville, Long Isl., August 13, 1891, *Hermann Schrenk* (4).

Richmond Co.: Erastina, July 25, 1894, *C. L. Pollard* (2); August 21, 1894, *Pollard* (2, 3).

NEW JERSEY

Austin (4).—Swamps, pine barrens of New Jersey, August, 1862, *Wm. M. Canby* (16); July 29, 1865, *Dr. H. Wood, Jr.* (4).

Monmouth Co.: Pine barren swamp, Smithburg, August 8, 1884, *O. E. Pearce* (2).

Mercer Co.: Trenton, July 10, 1889 (5).

Burlington Co.: Atsion, August, 1874, *H. H. Rusby* (10).—Quaker Bridge (2).

Camden Co.: Winslow, August, 1878, *Isaac C. Martindale* (2).

H. blephariglottis

Atlantic Co.: Egg Harbor, August 10 (flowers), September 3, 1888 (fruit), *Dr. J. Bernard Brinton* (8).

PENNSYLVANIA, Monroe County
Pocono Mt., August 1, 1860, *T. C. Porter* (2); August 20, 1860, *Porter* (3); *Dr. Traill M. Greene* (16).

DELAWARE, Sussex County
Swamps, Sussex, July, 1878, *Wm. M. Canby* (8).—Swamp one mile south of Lewes, July 23, 1878, *Canby* (16).

MARYLAND, Prince George County
Hyattsville, August 13, 1904, *Philip Dowell* (2).
Anne Arundel Co.: July, 1891, *K. A. Taylor* (5).
Wicomico Co.: Swamps, Salisbury, July 21, 1893, *Wm. M. Canby* (5).

VIRGINIA, Nansemond County
Sphagnum swamps near Suffolk, July 27, 1897 (Biltmore no. 4966 a) (2, 3, 4, 5); July 24, 1893, *A. A. Heller* (no. 1137) (2, 3, 4).

NORTH CAROLINA, Swain County
Dry hillsides, 1700–4000 ft., July 15–August 15, 1891, *H. C. Beardslee & C. A. Kofoid* (4).
Henderson Co.: Swamps of Muddy Creek, August 20, 1881, *John Donnell Smith* (3).

OHIO, Summit County
Summit Lake, Akron, July 24, 1889, *Dr. Kent O. Foltz* (11); Akron, *J. L. R.* (3).

MICHIGAN, Ingham County
In sphagnum, abundant, Towar's swamp, Agricultural College, July 23, 1894, *C. F. Wheeler* (3).

H. blephariglottis var. *conspicua*

H. blephariglottis *Hook.*, var. **conspicua** (*Nash*) *Ames*, in Rho. 10: 70 (1908), in Gray's Man. ed. 7, 310 (1908).—**H. conspicua** *Nash*, in Bull. Torr. Bot. Cl. 23: 100 (1896).

Blephariglottis conspicua *Small*, Fl. Se. U. S. 313 (1903).

"Habenaria conspicua n. sp.

"Whole plant glabrous, 4–8 dm. tall. Leaves linear to lanceolate-linear, erect or ascending, usually acute, the lower one 10–25 cm. long, 1–2 cm. broad, the remaining ones gradually be-

H. blephariglottis var. *conspicua*

coming shorter and passing into the bracts of the inflorescence; spike ovate to oblong, 6–12 cm. long, 5–7 cm. in diameter; flowers numerous, white; tube of the calyx 2–2.5 cm. long, the sepals orbicular or nearly so, 7 mm. in diameter; petals oblanceolate, about 5 mm. long, from nearly entire to more or less toothed at the apex; lip 12–15 mm. in length, narrowly oblong, the claw 4–5 mm. long, the blade deeply fimbriate; spur curved, narrowly cylindric, 4–5 cm. in length.

"Collected on the edge of a sphagnum bog at Lake City, Columbia Co. [Fla.], No. 2501, and observed at a number of other places. It was distributed in my collection of 1894 under No. 1700, as *H. blephariglottis*, from which it is abundantly distinct, the larger flowers, longer spur, and deeply fimbriate lip readily separating it." Nash, *loc. cit.*

Although characteristic plants of this variety are easily separable from the type, intergrading forms occur which make any attempt at distinction purely arbitrary.

NORTH CAROLINA

1847, *Met Curtis* (4).—Wet savannahs, eastern North Carolina, July and August, *G. M. McCarthy* (2, 16).

Craven Co.: Newburn, July 31, 1898, *Thos. H. Kearney, Jr.* (no. 1939) (2); August 1, 1898, *Kearney* (no. 1979) (2).

Cumberland Co.: Bogs near Fayetteville, August 13, 1903 (Biltmore no. 4966d) (5).

New Hanover Co.: Wilmington, 1881, *W. R. Smith* (2).

Brunswick Co.: August 15, 1884, *McCarthy* (2).

SOUTH CAROLINA, Beaufort County

Bluffton, 1873, *Dr. J. H. Mellichamp* (16).

GEORGIA, Chatham County

Moist grassy pine barrens, Savannah, August 17, 1900 (Biltmore no. 691 b) (5).

Charlton Co.: Sphagnum bog two miles east of Folkstone, August 12, 1902, *R. M. Harper* (no. 1508) (2, 3, 4).

H. blephariglottis var. *conspicua*

Worth Co.: Vicinity of Poulan, August 14–15, 1900, *C. L. Pollard & W. R. Maxon* (no. 584) (2).

Colquitt Co.: Sphagnous bog along Ochlocknee Creek, near Moultrie, August 22, 1903, *R. M. Harper* (no. 1944) (1).

Thomas Co.: Thomasville, August and September, 1903, *Mrs. A. P. Taylor* (1, 7); August 4, 1902, *Mrs. Taylor* (1).

FLORIDA, Duval County

Jacksonville, 1875, *A. H. Curtiss* (2); waste places in Jacksonville, August, 1877, *Curtiss* (no. 2757) (2, 3, 4, 7, 8); August 14, 1893, *Curtiss* (no. 4178) (2); springy places near Jacksonville, August 10, 1894, *Curtiss* (no. 5145) (2); margin of swamp in pine barrens near Jacksonville, August 30, 1900, *Curtiss* (no. 6707) (2, 3, 4, 7).

Columbia Co.: Lake City, August 29–31, 1895, *Geo. V. Nash* (no. 2501) (2, 3, 4, 10) (type number of *H. conspicua*).

Liberty Co.: Swamps, August 26, 1901 (Biltmore no. 691c) (5).

Franklin Co.: Apalachicola, *Chapman* (4); swamps, Apalachicola, July–August, *Chapman* (Biltmore dist. no. 4966b) (2, 3, 4, 5).

Lake Co.: Vicinity of Eustis, August 16–25, 1894, *Nash* (no. 1700) (2, 3, 4, 10).

Orange Co.: Swamps, August 19, 1902, *A. Fredholm* (no. 5497) (3).

ALABAMA, Winston County

1866, *T. M. Peters* (16).

Tuscaloosa Co.: Tuscaloosa, *Dr. E. A. Smith* (12).

Butler Co.: Swamps, Greenville, August 11, 1900 (Biltmore no. 4966d) (5).

Mobile Co.: Mobile, *C. Mohr* (12).—Biloxi, September 6, 1900, *F. E. Lloyd & S. M. Tracy* (no. 315) (1).

MISSISSIPPI, Jackson County

Ocean Springs, August 30, 1889, *F. S. Earle* (1).

Harrison Co.: Beauvoir, September 4, 1898, *S. M. Tracy* (no. 5079) (2, 4, 14).

TENNESSEE (?)

Cumberland Mts., 1888, *Mrs. Bennett* (8) (a form with entire labellum).

H. lacera

28. **H. lacera** (*Michx.*) *R. Br.*, Prodr. 312 (1810); *Lodd.*, Bot. Cab. t. 229 (1818–24); *Lindl.*, in Donn's Hort. Cant. ed. 10, 332

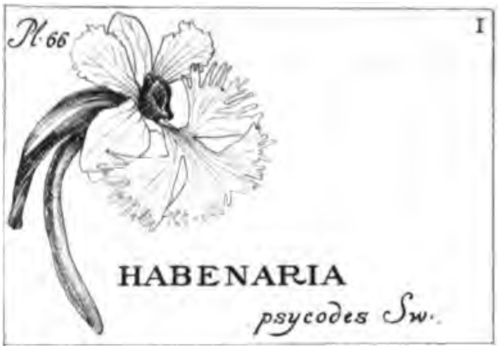
PLATE 66

I. *Habenaria psycodes.* II. × *H. Andrewsii.*
III. *H. lacera.*

All drawn, enlarged, with the aid of the camera lucida.

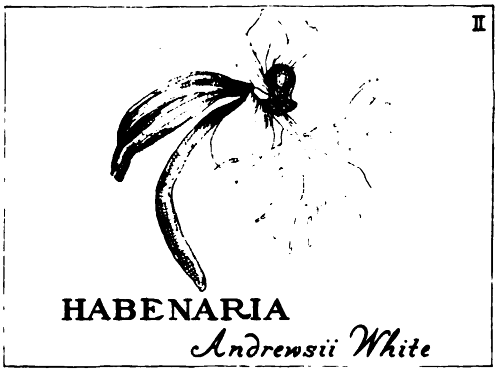
Pl. 66

I



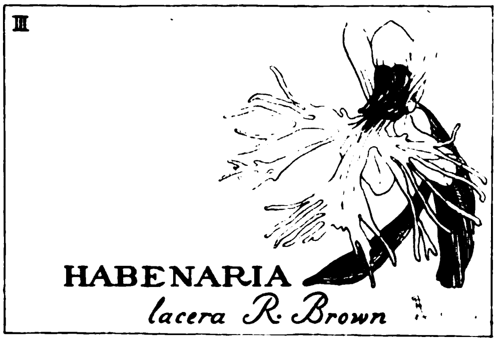
HABENARIA
psycodes Sw.

II



HABENARIA
Andrewsii White

III



HABENARIA
lacera R. Brown

(1823); *Spreng.*, Syst. Veg. 3:693 (1826); *Loud.*, Hort. Brit. ed. 1, 367 (1830); *Sweet*, Brit. Fl. Gard. ser. 2, 1, t. 73 (1831); *Gray*, in Sill. Journ. 38: 311 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Gray*, Man. ed. 5, 502 (1867), ed. 6, 509 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 409 (1895); *Willis*, Cat. N. J. 61 (1874); Fl. Columbiana 18 (1876); *J. Robinson*, Fl. Essex Co. 108 (1880); *Ward*, Fl. Wash. 119 (1881); *Britton*, Prel. Cat. N. J. 94 (1881); Pl. Malden & Medf. 11 (1881); *Day*, Pl. Buffalo 140 (1882); *Perkins*, Gen. Cat. Vt. 87 (1882); *Jackson*, Fl. Worcester Co. 82 (1882); *Baker*, Fl. Waltham 24 (1883); *Upham*, Fl. Minn. 140 (1884); *Dudley*, Cayuga Fl. 96 (1886); *Tracy*, Fl. Mo. 84 (1886); *Dame & Collins*, Fl. Middlesex 103 (1888); *Perkins*, Fl. Vt. 278 (1888); *Bennett*, Pl. R. I. 43 (1888); *Owen*, Pl. Nantucket 58 (1888); *Macoun*, Cat. 4: 19 (1888); *Britton*, Cat. N. J. 235 (1889); *Macoun*, Check-list 53 (1889); *Beal & Wheeler*, Fl. Mich. 608 (1891); *Fernald*, in Portl. Cat. 64 (1892); *MacMillan*, Metasp. Minn. Val. 166 (1892); *Baldw.*, Orch. N. Eng. 110, 116, f. 5 (1894); *Millsp. & Nutt.*, Fl. W. Va. 200 (1896), excl. syn.; *Deane*, Fl. Met. Park 79 (1896); *Britton & Br.*, Ill. Fl. 1: 465, f. 1109 (1896); *Galen*, Fl. Lanc. Co. 15 (1898); *Clute*, Fl. Up. Susq. 106 (1898); *Mill. & Whit.*, Wild Fl. Northeast. St. 554, t. (1898); *Andrews*, Pl. Meriden Mt. no. 214 (1899); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Mohr*, Pl. Life Ala. 455 (1901); *Jelliffe*, Gibson's Nat. Orch. 54, t. 25, f. 1 (1905); *Mathews*, Field-book 90, 91, fig. (1902); *Bissell & Andrews*, Fl. Southington 36 (1902); *Andrews*, in Rho. 2: 114 (1900). *H. lacera*

Orchis radice palmata: foliis Lilii caule foliis minoribus alternis vestito. *Clayt.* n. 644 *Gron.*, Fl. Virg. ed. 1, 184 (1739).

Orchis habenaria *Walt.*, Fl. Carol. (1788) not *L.*—**O. lacera**

H. lacera *Michx.*, Fl. 2: 156 (1803); *Pers.*, Syn. 2: 508 (1807); *Pursh*, Fl. 2: 586 (1814); *Barton*, Comp. Fl. Phil. 2: 137 (1818); *Elliott*, Sketch 2: 484 (1824), excl. spec. *Macbride; Torr.*, Cat. N. Y. 69 (1819); *Eaton*, Man. ed. 4, 374 (1824); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 41, 534 (1856); *Provanch.*, Fl. Canad. 2: 567 (1862).—**O. psycodes** *Willd.*, Sp. Pl. 4: 39 (1805); *Muhl.*, Cat. 80 (1813), excl. syn.; *Pursh*, Fl. 2: 585 (1814); *Big.*, Fl. Bost. ed. 1, 206 (1814), ed. 2, 319 (1824), ed. 3, 341 (1840); *Nutt.*, Gen. 2: 189 (1818); *Eaton*, Man. ed. 4, 374 (1824); *Nutt.*, in Tr. Am. Phil. Soc. n. s. 5: 161 (1834); *Martyn*, in Mill. Dict. ed. 9, 2: no. 45 (1807). Not *O. psycodes* L.—**O. lacera psycodes** *Muhl.*, Cat. 80 (1813); *Green*, Cat. N. Y. 120 (1814).

Habenaria psychodes *Spreng.*, Syst. Veg. 3: 693 (1826), excl. syn.; *Torr.*, Comp. 317 (1826); *Beck*, Bot. ed. 1, 349 (1833), excl. syn. *L.; Darl.*, Fl. Cestr. ed. 1, 509 (1837); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840); *Darby*, Bot. S. St. 527 (1866). Not *H. psycodes* Sw.

Platanthera psychodes *Lindl.*, Gen. & Sp. Orch. 294 (1835), excl. syn. in part, not *Gray; Hook.*, Fl. Bor. Am. 2: 200 (1839), excl. syn. in part; *Steud.*, Nomencl. ed. 2, 2: 352 (1841), excl. syn. in part.—**P. lacera** *Don*, in Sweet's Hort. Brit. ed. 3, 650 (1839); *Torr.*, Fl. N. Y. 2: 278 (1843); *Gray*, Man. ed. 1, 472 (1848), ed. 2, 446 (1856), ed. 3, 446 (1859); *Darl.*, Fl. Cestr. ed. 3, 312 (1853); *Green & Congd.*, Class-book 203 (1855); *Beck*, Bot. ed. 2, 348 (1856); *Tatnall*, Cat. Pl. Newc. Co. Del. 75 (1860); *Hervey*, Cat. 21 (1860); *Chapm.*, Fl. S. U. S. ed. 1, 460 (1860), ed. 2, 460 (1884), ed. 3, 486 (1897); *Wood*, Class-book 685 (1861); *Paine*, Pl. Oneida Co. 84 (1865); Portl. Cat. 7 (1868); *Darrach*, Pl. Phila. 9 (1882); *Tracy*, Fl. Essex Co. 81 (1892); *Correvon*, Orch. Rust. 173 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 606 (1899).

Blephariglottis lacera *Rydb.*, in Britton's Man. 296 (1901);

H. lacera

Farwell, in Rep. Mich. Acad. Sci. 2: 42 (1901); *Small*, in Porter's Fl. Pa. 94 (1903); *C. B. Robinson*, in Bull. Pictou Acad. 1: 35 (1907).

Habenaria lacera × H. clavellata *Niles*, Bog-trotting for Orchids 257 (1904), reference.

"LACERA. O. foliis spicaque oblongis; floribus distincte alternis: cornu fere ovarii longitudine: labello longiore, anguste tripartito; laciniis subdigitatis, filiformibus.

"*Hab.* in Carolina." Michx. *loc. cit.*[1] (Plate 66.)

NEWFOUNDLAND

Marsh, Holyrood, August 22, 1894, *B. L. Robinson & H. Schrenk* (2, 3, 6).

NOVA SCOTIA

In boggy places below Island Pond, Sable Isl., July 26, 1899, *J. Macoun* (6).

Cape Breton Co.: Damp, sandy ground, Sydney, August 18, 1902, *M. L. Fernald* (3).—Boggy places, North Sydney, July 12, 1883, *Macoun* (3); moist meadows, July 13, 1883, *Macoun* (6).

Victoria Co.: Meadows, Baddeck, Cape Breton, July 19, 1883, *Dr. T. J. W. Burgess* (3); rich damp woods, July 18, 1883, *Macoun* (3); wet meadows and bogs, July 18, 1883, *Macoun* (6); bogs, July 19, 1883, *Macoun* (3); fields, July 25, 1898, *Macoun* (6).

Pictou Co.: Damp meadow, near Pictou, July 12–18, 1901, *C. D. Howe & W. F. Lang* (no. 545) (3).

Guysborough Co.: Boylston, July, 1890, *Dr. C. A. Hamilton* (2, 6); July 17, 1879, *H. L. Osborn* (2).

Kings Co.: Damp soil along railroad, July 8 and 9, 1901, *Howe & Lang* (no. 238) (3).—Damp, sandy ground, Kentville, August 22, 1902, *Fernald* (3).

Halifax Co.: Halifax, August 5, 1902, *W. H. Blanchard* (7).

Digby Co.: Digby, July, 1895, *M. L. Overacker* (5).—Metaghan, July 22, 1896, *E. Brainerd* (7).

PRINCE EDWARD ISLAND

August, 1888, *J. Macoun* (2, 3).

Prince Co.: Roadsides and fields, Tignish, July 26, 1888, *Macoun* (6).

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[1] There remains in the Michaux Herbarium at Paris a flowerless fragment, and two flowers in a pocket. (A. A. E.)

H. lacera Queens Co.: Royalty Junction, July 22, 1901, *J. R. Churchill* (3).

NEW BRUNSWICK, Victoria County

Rich woods, Tobique, July 28, 1884, *Geo. U. Hay* (6).

ONTARIO, Hastings County

In low rich woods near Belleville, July 15, 1867, *J. Macoun* (6).

Wellington Co.: Wet thickets, Snell's Lake, July 16, 1890, *James White* (6).—Cranberry marsh, Killean, July 6, 1904, *A. B. Klugh* (1).

Huron Co.: Wingham, July 19, 1891, *J. A. Morton* (6); July 16, 1892, *Morton* (5).

Lincoln Co.: Gardener's Bush, St. Catharines, July 3, 1897, *W. C. McCalla* (no. 334) (5).

Welland Co.: Damp woods, Niagara Falls, 1893, *Cameron* (6).

Norfolk Co.: Boggy woods, Port Rowan, July 17, 1892, *J. Macoun* (6).

MANITOBA

Rich meadows, Hamilton, July, 1875, *Thomas Morong* (2).

MAINE, Franklin County

Sterile field, South Chesterville, July, 1903, *Lillian O. Eaton* (1).—Wet field, Farmington, July 25, 1902, *Clarence H. Knowlton* (1).

Kennebec Co.: Augusta, August 2, 1886, *E. C. Smith* (4).

Androscoggin Co.: East Auburn, July 8, 1895, *E. D. Merrill* (no. 999) (2).

Cumberland Co.: Fort Preble, July, 1895, *E. E. Gayle* (no. 804) (2).—Cushing's Isl., August 4, 1895, *J. Fowler* (5).—Damp roadside, Cumberland, July 26, 1901, *Edward B. Chamberlain* (1).—Scarboro, July 21, 1901, *Dr. D. W. Fellows* (1).

York Co.: Moist meadow, Seabury, July 21, 1901, *F. Tracy Hubbard* (1).—Swampy woods, York Harbor, August 9, 1901, *Hubbard* (1).—Kittery, July 17, 1896, *Hubbard* (1).—South Berwick, July 22, 1891, *J. C. Parlin* (3).

NEW HAMPSHIRE, Cheshire County

Low open field, Jaffrey, July 23, 1896, *Walter Deane* (1); July 26, 1896, *Miss Mary A. Day* (no. 76) (3).

VERMONT

Ashland, *De Chalmot* (2).

Windsor Co.: Windsor, July 24, 1902, *W. H. Blanchard* (7).

Rutland Co.: East Hubbardton, July 17, 1898, *W. W. Eggleston* (5).—Scarce, Hubbardton, July 17, 1898, *Eggleston* (4).

Bennington Co.: Wet meadow, Pownal, August 5, 1901, *A. L. Ander-*

son (3).—Manchester, July 21, 1898, *M. A. Day* (no. 315) (3).

H. lacera

WINDHAM Co.: Open pasture, Putney, July 28, 1902, *Blanchard* (3).

MASSACHUSETTS, ESSEX COUNTY

Lynnfield, July 19, 1854, *Wm. Boott* (3).—Danvers, *Susan M. Hallowell* (2).—Bay View, Gloucester, 1904, *O. Ames* (1); road bank, September 8, 1903, *Ames & A. A. Eaton* (1).—Wet meadows, Hamilton, July, 1875, *Thos. Morong* (2).

MIDDLESEX Co.: Edgeworth, July 19, 1853, *Wm. Boott* (3).—Malden, June 27, 1881, *R. Frohock* (6).—Wet field, Natick, July 17, 1898, *C. H. Knowlton* (1).—South Wilmington, July 19, 1897, *Chester C. Kingman* (5).—South Framingham, July 21, 1890, *E. L. Sturtevant* (4).

WORCESTER Co.: Grassy roadside, frequent, Webster, July 13, 1899, *Leland J. Spalding* (17).

FRANKLIN Co.: Shelburne, July 10, 1873, *Miss E. L. Anderson* (10).

BERKSHIRE Co.: June 19, 1897, *Mrs. Mulligan* (4).

HAMPSHIRE Co.: Cummington, 1888, *Dr. Dwight* (4).—Southampton, (1892) (5).

HAMPDEN Co.: Granville, August, 1889, *A. B. Seymour* (1).—Tolland, July, 1874, *Mrs. S. M. Piper* (7).

NORFOLK Co.: Dedham turnpike near Taft's, July 17, 1854, *Wm. Boott* (3).—Purgatory swamp, Dedham, July 21, 1888, *Faxon* (3).—Milton, *A. P. Chute* (3).—Neponset meadow, Milton, August 1, 1888, *Faxon* (2, 3).—Wellesley, July, 1893 (2).—Bay Road, Stoughton, July 16, 1903, *Eaton* (1).

PLYMOUTH Co.: Swamp in Quaker Leonard road, Brockton, July 22, 1903, *Eaton* (1); July 16, *Eaton* (1).

BRISTOL Co.: North Easton, 1893, *Ames* (1); July, 1898, *Carl Blomberg* (1, 5); dry field, July 19, 1903, *Eaton* (1); swamp near railroad, July 25, 1903, *Eaton* (1).—Taunton, July 12, 1903, *Eaton* (1).—Nonquit, July 26, 1888, *E. L. Sturtevant* (4).

BARNSTABLE Co.: Wood's Holl, July 10, 1884, *Mrs. Peters* (2); August, 1887, *Wm. Trelease* (4).

DUKES Co.: Martha's Vineyard, August, 1888, *Carrie Harrison* (2).

RHODE ISLAND, PROVIDENCE COUNTY

Meadows, Providence, July, 1844, *Geo. Thurber* (3).

NEWPORT Co.: Block Isl., July, 1889, *Rev. L. H. Lighthipe* (3).

CONNECTICUT

Chas. Wright (4).

H. lacera Hartford Co.: Weathersfield (3).—Boggy ground, Southington, July 17, 1898, *C. H. Bissell* (no. 575) (3).

New Haven Co.: Waterbury, July 29, 1881, *Constance G. DuBois* (2).

Fairfield Co.: Abundant in sphagnum bogs, July 16, 1894, *C. L. Pollard* (no. 196) (2).—Green's Farms, July 7, *Pollard* (no. 162) (2).—Swamps, Sandy Hook, July, 1890, *I. Percy Blackman* (5).

NEW YORK

Western New York, *A. Gray* (3).—Mallonyville, June 26, 1878, *Wm. Trelease* (4).

Washington Co.: Dry fields, Vaughns, July 11, 1896, *Stewart H. Burnham* (1).

Oswego Co.: Swamp, North Hannibal, July 9, 1882, *O. E. Pearce* (2).

Oneida Co.: July 15, 1903, *Dr. J. V. Haberer* (1).—In a sand bog, Deerfield, June 18, 1901, *Haberer* (no. 883a) (1).—Hill south of Utica, July 26, 1902, *Haberer* (no. 883) (1, 3).

Madison Co.: Oneida, July 7, 1898, *H. D. House* (18).

Ontario Co.: Canandaigua, 1881, *Mrs. Autriss* (2).

Chenango Co.: Preston, June 28, 1886, *F. V. Coville* (2).

Suffolk Co.: Shinnecock Hills, L. I., July, 1896, *T. M. Fry* (1).—Near third house, Montauk, July 22, 1895, *Jos. Schrenk* (4).

NEW JERSEY

Ex Hb. Torrey (3).

Sussex Co.: Bogs, Stockholm, July 20, 1892, *Wm. M. Van Sickle* (2); August 10, 1894, *Van Sickle* (2).

Essex Co.: Belleville, July 3, 1897, *Clute & Wilson* (1).

Mercer Co.: Trenton, July 18, 1886 (5).

Camden Co.: Cooper's Point bogs, Camden, May 25, 1848, *Thos. P. James* (2).

Cape May Co.: Cape May, July 11, 1888, *Dr. J. Bernard Brinton* (8).

PENNSYLVANIA, Luzerne County

Lily Lake, August 15, 16, 1889, *John K. Small* (1, 2); July 29, 1889, *A. A. Heller* (3).

Blair Co.: July 8, 1860, *Boecking* (2).

Chester Co.: West Chester, *W. W. Jefferis* (2); *T. S. D.* (?) (ex Hb. S. B. Buckley) (4).

DELAWARE

Swamps, Ogletown, July 12, 1902, *Wm. M. Canby* (3).

Newcastle Co.: Swamps near Wilmington, June, 1874, *Canby* (16).

Kent Co.: Milford, June, 1866 (16).

Sussex Co.: Upland meadows, Ellendale, July 15, 1878, *Canby* (16); July 24, 1893, *Canby* (5).

MARYLAND, Prince George County

Laurel, July 9, 1895, *Geo. Marshall* (2).

Anne Arundel Co.: Near Glen Burnie, September 4, 1893, *Adam Steitz* (2).

DISTRICT OF COLUMBIA

In swamps, rare, June, 1903, *Th. Holm* (1); low grounds, rare, June, 1897, *Holm* (1).—Swamp beyond East Branch, Kenilworth, July 13, 1897, *E. S. Steele* (2).—Kenilworth, June 10, 1898, *Steele* (2).—Rive's Station, June 26, 1887, *L. F. Ward* (2).—Terra Cotta, July 12, 1879, *Ward* (2).

VIRGINIA

Fort Myer, June 28, 1895, *D. LeRoy Topping* (2).

NORTH CAROLINA

C. W. Short (4).

Iredell Co.: Statesville, *M. E. Hyams* (5).

Buncombe Co.: Roandale farm, July 5, 1895, *A. G. Wetherby* (no. 159) (2).

Henderson Co.: Damp soil, margins of swamps near Hendersonville, June 29, 1898 (Biltmore dist. no. 4815 a) (2, 3, 4, 5).

Lincoln Co.: *Met Curtis* (3).

Cumberland Co.: Low ground, Fayetteville, June 17, 1902 (Biltmore dist. no. 4815 a) (5).

ALABAMA, Blount County

Moist rocky soil, Sand Mt., June 7, 1900 (Biltmore no. 4815c) (5).

Lee Co.: Low places, Auburn, May 6, 1896, *F. S. Earle* (12).

WEST VIRGINIA, Summers County

Near Barger's Spring, July 13, 1900, *E. L. Morris* (no. 989) (2).

Pocahontas Co.: Valley of the east fork of the Greenbrier River, September 19, 1904, *J. M. Greenman* (no. 67) (1).

OHIO, Cuyahoga County

Near Cleveland, *Wm. Krebs* (1).

Lorain Co.: Pittsfield, July 11, 1894, *Alfred E. Ricksecker* (2).—Oberlin, July 27, 1894, *W. M. Dick* (1).

Erie Co.: Furnace woods, Vermillion Township, July 25, 1897, *E. L. Moseley* (2).

H. lacera MICHIGAN, Keweenaw County

Low moist places, July, 1887, *O. A. Farwell* (no. 486) (3).—Clifton, September 12, 1886, *Farwell* (no. 486) (11).

Roscommon Co.: In swampy places, Roscommon, July 22, 1903, *Mell & Knopf* (4).

St. Clair Co.: Algonac, August, 1884, *A. B. Lyons* (10).

Ingham Co.: Agricultural College, June 29, 1895, *W. E. Mulliken* (5).

Jackson Co.: Wet meadows, June 20, 1896, *S. H. & D. R. Camp* (5).

Wayne Co.: Low grounds at Detroit, July 3, 1893, *O. A. Farwell* (11).

INDIANA

Swales, Miller's, June 27, 1889, *L. M. Umbach* (2).

Steuben Co.: On low border on west side of Long Lake, July 4, 1904, *Chas. C. Deam* (1).—Around border of Graveyard Lake, July 5, 1904, *Deam* (1)

Wells Co.: On east side of large lake on low border in Jackson Township, June 26, 1904, *Deam* (1).

ILLINOIS, Ogle County

Oregon, July 6, 1885, *Merton B. Waite* (1).—Pine Rock, July 6, 1885, *Waite* (2).

St. Clair Co.: Fertile woods, East St. Louis, 1878, *H. Eggert* (4).

WISCONSIN, Marinette County

Prairies, Marinette, July 6, 1891, *J. H. Schuette* (1).

Dane Co.: Edge of dry bog, Madison, July 6, 1889, *Wm. Trelease* (4).

Racine Co.: Point Swamp, July 9, 1898, *S. C. Wadmond* (5).

MISSOURI, St. Louis County

Dry woods, St. Louis, June 22, 1878, *H. Eggert* (4); woody hills, June 11, 1878, *Eggert* (3, 4).

Shannon Co.: June 8, 1890, *Frank Bush* (no. 85) (2).

H. leucophæa 29. **H. leucophæa** (*Nutt.*) *Gray*, Man. ed. 5, 502 (1867), ed. 6, 509 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 409 (1895); *Upham*, Fl. Minn. 140 (1884); *Tracy*, Fl. Mo. 84 (1886); *Brendel*, Fl. Peor. 60 (1887); *Macoun*, Cat. 4: 19 (1888); *Kellerman*, Fl. Kans. 167 (1888); *Macoun*, Check-list 58 (1889); *Beal & Wheeler*, Fl. Mich. 608 (1891); *MacMillan*, Metasp. Minn.

Val. 166 (1892); *Britton & Br.*, Ill. Fl. 1: 465, f. 1110 (1896); *Saunders*, Fl. S. Dak. 181 (1899); *Jelliffe*, Gibson's Nat. Orch. 56, t. 25, f. 2 (1905).

H. leucophæa

Orchis leucophœa *Nutt.*, in Trans. Am. Phil. Soc. n. s. 5: 161 (1834); *Wood*, Class-book ed. 41, 535 (1856).

Platanthera leucophæa *Lindl.*, Gen. & Sp. Orch. 294 (1835); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Gray*, Man. ed. 1, 472 (1848), ed. 2, 446 (1856), ed. 3, 446 (1859); *Wood*, Class-book 685 (1861); *Kränzl.*, Orch. Gen. et Sp. 1: 605 (1899).

Blephariglottis leucophæa *Rydb.*, in Britton's Man. 296 (1901); *Farwell*, in Rep. Mich. Acad. Sci. 2: 42 (1901); *Small*, Fl. Se. U. S. 314 (1903); *House*, in Torreya 8: 52 (1908).

"3. O. *leucophœa*. Labello tripartito, laciniato, maximo; laciniis lateralibus internis obovatis crenulatis; cornu filiformi clavato, germine longiore.—*Hab.* In moist prairies near Kiamesha, Red river. Flowering in June.—*Obs.* Probably the largest species in the United States; the stem being from eighteen inches to two and a half feet high; leaves oblong-lanceolate, diminishing into narrow lanceolate bracts, about the length of the germ; flowers white, a little tinged with green; the lateral segments of the petaloid calix ovate, and less than half the length of the lip, which is divided into three dilated segments, divided nearly to the base into many capillary portions. It is more nearly allied to O. incisa than psycodes, but differs from the former in the laciniated lip, and from the latter by the multiplicity of its segments, and the obovate instead of linear form of the two internal petaloid divisions." Nutt. *loc. cit.*

NOVA SCOTIA, Cape Breton County
North Sydney, July 11, 1883, *J. Macoun* (16).

ONTARIO, Huron County
Wingham, July 16, 1892, *J. A. Morton* (5).

H. leucophæa MIDDLESEX Co.: In mossy bogs, London, July 9, 1879, *Burgess* (6).
LAMBTON Co.: Hundreds of acres of it, Walpole Isl., July 11, 1894, *C. K. Dodge* (6).

MAINE, AROOSTOOK COUNTY
In moss, Caribou bog, Crystal, July 30, 1906, *O. W. Knight* (1).

NEW YORK, OSWEGO COUNTY
Lily Marsh, nine miles east of Oswego, 1877, *J. H. Wibbe* (3).
WAYNE Co.: Fragrant, Newark, *E. L. Hankenson* (3).
YATES Co.: *T. Marshall Fry* (1).

OHIO, FRANKLIN COUNTY
Columbus, 1840, *W. S. Sullivant* (3).
STARK Co.: Peat morass, Canton, July, 1835, *F. Riehl* (4).

MICHIGAN
A. Gray (3).
MENOMINEE Co.: Prairies, Maraicagenses près Pembina, July 21, 1859, *Bourgeau* (3).
GRATIOT Co.: Marshes about ponds, Alma, July 20, 1895, *Chas. A. Davis* (2).
ST. CLAIR Co.: Near Port Huron, July 1, 1894, *C. K. Dodge* (3).
INGHAM Co.: Pine Lake, June 30, 1895, *W. E. Mulliken* (5).
WAYNE Co.: Grassy places on Belle Isle, Detroit River, July 3, 1894, *O. A. Farwell* (no. 1467) (11); Belle Isle, August, 1884, *H. H. Rusby* (10).

INDIANA, HAMILTON COUNTY
Meadows, 1876, *E. F. Shipman* (10).

ILLINOIS
S. B. Mead (4).—1873, *Dr. F. Brendel* (2).
MCHENRY Co.: Ringwood, *Geo. Vasey* (3, 16).
WINNEBAGO Co.: Very fragrant after sunset, Fountaindale, 1867, *W. S. Bebb* (3, 4, 16).
COOK Co.: Chicago, July, 1869, *Henry H. Babcock* (4).—Low prairies, West Chicago, July 9, 1898, *L. M. Umbach* (2).
STARK Co.: Moist prairies, east of Wady Petra, July 7, 1900, *Virginius H. Chase* (no. 665) (4).
MCLEAN Co.: Bloomington, July 15, 1882, *A. B. Seymour* (1); prairies, low ground, July, 1886, *B. L. Robinson* (3).
HANCOCK Co.: Moist prairies, Augusta, June 22, 1859, *S. B. Mead* (3).
CHAMPAIGN Co.: Flowers white, wet ground, Champaign, July 7, 1880,

H. leucophæa

A. B. Seymour (1).—Urbana, July 1, 1884, *M. B. Waite* (2, 11).

Adams Co.: La Prairie, near Camp Point, June 15, 1877, *A. B. Seymour* (1).

Macon Co.: Decatur, June 22, 1899, *Ira W. Clokey* (14).

Madison Co.: Wet prairies, June 17, 1878, *H. Eggert* (5); June 22, 1878, *Eggert* (3).

WISCONSIN, Dane County

Madison, *S. H. Watson* (16); moist meadows, July 15, 1889, *Wm. Trelease* (4).

Milwaukee Co.: Milwaukee, *Douglass* (6); prairies, July, 1843, *I. A. Lapham* (4).

Racine Co.: Banks of first Ravine, July 20, 1898, *S. C. Wadmond* (5). —Racine, June, 1884 (11).—Moist prairie, July 5, 1883, *Dr. H. E. Hasse* (16).

MINNESOTA, Nicollet County

Nicollet, July, 1892, *C. A. Ballard* (5).

IOWA, Emmet County

Low prairies, Armstrong, June 25, 1898, *R. I. Cratty* (2); July 20, 1898, *Cratty* (4).

Harden Co.: Near Iowa Falls, August, 1876, *M. E. Jones* (7).

Henry Co.: Mt. Pleasant, 1897, *J. H. Mills* (no. 1843) (4).

Decatur Co.: Prairies, infrequent, May 23, 1898, June, 1898, *Fitzpatrick* (3, 4, 5).

MISSOURI, Jackson County

On prairie, July, 1865, *G. C. Broadhead* (4).—Uncommon on prairie, Grain Valley, July 4, 1898, *B. F. Bush* (no. 273) (2, 3, 4, 5).—Prairies, locally frequent, Lee's Summit, June 11, 1899, *K. K. Mackenzie* (5).

St. Louis Co.: Wet prairies near St. Louis, June 11, 1878, *H. Eggert* (4, 7, 16).

Vernon Co.: On prairie, July 25, 1873, *G. C. Broadhead* (4).

ARKANSAS, White County

West Point, *Gunnison* (no. 16) (3).

LOUISIANA

Ex Hb. Geo. Thurber (3).

NEBRASKA

Platte bottom, *Fremont* (3).

Lancaster Co.: Lincoln, July, 1887, *H. J. Webber* (4).

H. leucophæa KANSAS, SHAWNEE COUNTY
Topeka, June 15, 1878, *E. A. Popenoe* (8).
DOUGLAS Co.: Lawrence, July, *W. C. Stevens* (2).

H. psycodes 30. **H. psycodes** (*L.*) *Sw.*, Adnot. Bot. 45 (1829); *Gray*, in Sill. Journ. 38: 310 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N. Y. 174 (1840); *Gray*, Man. ed. 5, 502 (1867), ed. 6, 509 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 409 (1895); *Willis*, Cat. N. J. 61 (1874); Yale Cat. 45 (1878); *James*, Cat. Cincinnati 18 (1879); *J. Robinson*, Fl. Essex Co. 108 (1880); Gard. Chron. n. s. 14: 305 (1880); Pl. Malden & Medf. 11 (1881); *Britton*, Prel. Cat. N. J. 94 (1881); *Perkins*, Gen. Cat. Vt. 37 (1882); *Day*, Pl. Buffalo 140 (1882); *Jackson*, Fl. Worcester Co. 32 (1883); *Baker*, Fl. Waltham 24 (1883); *Upham*, Fl. Minn. 140 (1884); *Dudley*, Cayuga Fl. 96 (1886); *Bennett*, Pl. R. I. 43 (1888); *Macoun*, Cat. 4: 19 (1888); *Dame & Collins*, Fl. Middlesex 108 (1888); *Perkins*, Fl. Vt. 278 (1888); *Britton*, Cat. N. J. 235 (1889); *Beal & Wheeler*, Fl. Mich. 608 (1891); *Fernald*, in Portl. Cat. 64 (1892); *MacMillan*, Metasp. Minn. Val. 166 (1892), (excl. syn. *Ait.*, *Big.*, & *H. grandiflora* Torr.); *Baldw.*, Orch. N. Eng. 110–113, f. 30 (1894); *Millsp. & Nutt.*, Fl. W. Va. 200 (1896); *Britton & Br.*, Ill. Fl. 1: 466, f. 1112 (1896), excl. syn. *Ait.; Deane*, Fl. Met. Park 79 (1896); *Galen*, Fl. Lanc. Co. 15 (1898); *Clute*, Fl. Up. Susq. 106 (1898); *Mill. & Whit.*, Wild Fl. Northeast. St. 550, t. (1898); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Andrews*, in Rho. 2: 114 (1900); *Kearney*, in Bail. Cyc. Am. Hort. 2: 706 (1900); *Gattinger*, Fl. Tenn. 62 (1901); *Mathews*, Field-book 92, fig. (1902); *Bissell & Andrews*, Fl. Southington 36 (1902); *Kennedy*, Fl. Willoughby in Rho. 6: 111 (1904); *Jelliffe*, Gibson's Nat. Orch. 59, t. 26 (1905). Not *H. psycodes* Spreng., Syst. Veg. 3: 698 in part; Torr., Comp. 317;

H. psycodes

Darl., Fl. Cestr. ed. 1, 509, ed. 3, 527; Eaton & Wr., N. A. Bot. ed. 8, 260; Darby, Bot. S. St. 527; Beck, Bot. ed. 1, 349 (all of these refer to *H. lacera*).

Orchis Marilandica spica brevi conferta, floribus parvis: calcaribus longissimis *Ray*, Suppl. 588 (1704).—**O. nectarii cornu setaceo, longitudine germinis, labio tripartito ciliari** *Gron.*, Fl. Virg. ed. 2, 137 (1762).

Orchis psycodes *L.*, Sp. Pl. ed. 1, 943 (1753), ed. 2, 1336 (1763), excl. *Gron.*, Fl. Virg. 184; *Forst.*, Cat. Pl. N. A. 39 (1771); *Poir.*, in Lam. Encyc. 4: 600 (1797); *Sw.*, in Act. Holm. 21: 207 (1800); *Pers.*, Syn. 2: 502 (1807); *Green*, Cat. N. Y. 120 (1814) in part; *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 41, 584 (1856). Not *Orchis psycodes* Willd., Sp. Pl. 4: 39; Muhl., Cat. 80; Pursh, Fl. 2: 585; Big., Fl. Bost. ed. 1, 206, ed. 2, 319, ed. 3, 341; Nutt., Gen. 2: 189; Eaton, Man. ed. 4, 374; Beck, Bot. ed. 1, 349 (in part), ed. 3, 341; Nutt., Fl. Ark. 161; Mill. Dict. ed. 9, no. 45 (all of these refer to *H. lacera*), nor *O. psycodes* Ell. (which is *H. cristata*).—**O. incisa** *Willd.*, Sp. Pl. 4: 40 (1805); *Pers.*, Syn. 2: 506 (1807); *Muhl.*, Cat. 80 (1813); *Torr.*, Cat. N. Y. 69 (1819). Not *O. incisa* Pursh, Fl. 2: 589; Nutt., Gen. 2: 189; Eaton, Man. ed. 4, 375 (all of these refer to *H. peramœna*).—**O. fissa** *Willd.*, Sp. Pl. 4: 40 (1805); *Pers.*, Syn. 2: 506 (1807);[1] *Muhl.*, Cat. 80 (1813). Not *O. fissa* Pursh, Fl. 2: 589; Eaton, Man. ed. 4, 375, nor *O. fusa* Nutt., Gen. 2: 189 (these refer to *H. peramœna*).

Habenaria fimbriata *R. Br.*, Prodr. 312 (1810), in Ait. Hort. Kew. ed. 2, 5: 193 (1813), excl. syn. (according to *Gray & Torr.*); *Torr.*, Comp. 319 (1826); *Hook.*, Exot. Fl. 3: t. 224, as to syn. in part; *Darl.*, Fl. Cestr. ed. 1, 508 (1837); *Dewey*, Herbaceous

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[1] Persoon gives *O. fusa* which is undoubtedly a misprint. Nuttall seems to have adopted this spelling.

H. psycodes Pl. Mass. 197 (1840); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840).

Orchis fimbriata *Big.*, Fl. Bost. ed. 1, 206 (1814), ed. 2, 320 (1824), ed. 3, 343 (1840); *Pursh*, Fl. 2: 588 (1814); (cf. *Gray*, Man. ed. 1); *Provanch.*, Fl. Canad. 2: 567 (1862).—**O. cristata** *Barton*, Comp. Fl. Phil. 2: 187 (1818), excl. *O. cristata* Michx.

Habenaria racemosa *Raf.*, in Ann. Nat. 15 (1820); (cf. *Torr.*, Fl. N. Y. 2: 278).—**H. fissa** *Spreng.*, Syst. Veg. 3: 692 (1826); *Torr.*, Comp. 319 (1826); *Darl.*, Fl. Cestr. ed. 1, 508 (1837); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840). Not *H. fissa* R. Br. etc. (which is equivalent to *H. peramœna*).—**H. incisa** *Spreng.*, Syst. Veg. 3: 692 (1826); *Torr.*, Comp. 319 (1826); *Beck*, Bot. ed. 1, 349 (1833); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840).

Platanthera incisa *Lindl.*, Gen. & Sp. Orch. 293 (1835), excl. syn. *Pursh; Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Correvon*, Orch. Rust. 173 (1893); *Williams*, Orch. Grow. Man. ed. 7, 679 (1894). Not *Lindl.*, in Paxt. Fl. Gard. 2: 24; Fl. des Serres 8: 20, t. 3 (= *H. fimbriata*).—**P. fimbriata** *Lindl.*, Gen. & Sp. Orch. 293 (1835), excl. syn. *Hort. Kew.* & *Willd.*, not of authors; *Steud.*, Nomencl. ed. 2, 2: 351 (1841), excl. syn. *Ait.*—**P. crispa** *Lindl.*, Gen. & Sp. Orch. 294 (1835);[1] *Correvon*, Orch. Rust. 169 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 606 (1899).—**P. psycodes** *Lindl.*, Gen. & Sp. Orch. 294 (1835), excl. descr. and all syn. but *L.* (Lindley's specimens in his herbarium are *Habenaria lacera!*); *Steud.*, Nomencl. ed. 2, 2: 352 (1841), excl. syn. in part; *Hook.*, Fl. Bor. Am. 2: 200 (1839), excl. all syn. but *L.; Torr.*, Fl. N. Y. 2: 278 (1843); *Gray*, Man. ed. 1, 472 (1848), ed. 2, 446 (1856), ed. 3, 446 (1859); *Darl.*, Fl. Cestr. ed. 3, 312 (1853); *Green & Congd.*, Class-book 203 (1855); *Beck*, Bot. ed. 2, 348 (1856); *Tatnall*, Cat. Pl. Newc. Co. Del. 75 (1860); *Chapm.*, Fl. S. U. S. ed. 1, 460 (1860), ed. 2, 460 (1884), ed. 3, 487 (1897); *Hervey*, Cat.

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[1] Lindley thought this might be a hybrid between *Habenaria cristata* and *H. psycodes*.

21 (1860); *Wood,* Class-book 685 (1861); *Paine,* Pl. Oneida Co. 84 (1865); Portl. Cat. 7 (1868); *Tracy,* Essex Fl. 81 (1892); *Correvon,* Orch. Rust. 175 (1893); *Kränzl.,* Orch. Gen. et Sp. 1: 607 (1899), 989 (1901), excl. syn. *Lindl., Ait.,* &c.—**P. fimbriata** β **floribus minoribus** *Hook.,* Fl. Bor. Am. 2: 200 (1889).

H. psycodes

Blephariglottis psycodes *Rydb.,* in Britton's Man. 296 (1901); *Small,* Fl. Se. U. S. 314 (1903), in Porter's Fl. Pa. 94 (1903); *C. B. Robinson,* in Bull. Pictou Acad. 1: 35 (1907).

It is a hopeless task to attempt to arrive at satisfactory conclusions regarding the correct synonymy of *Habenaria psycodes* and *H. fimbriata.* Early in the history of these closely allied species confusion was established, and although several authors have endeavored to eliminate it there are obstacles which it is probable will always exist. Botanists have reported their material under one name or the other, and have, with few exceptions, added confusion by unstudied references to literature.

For example, Lindley described two varieties of *H. psycodes* which are clearly referable to *H. lacera,* as an examination of his specimens will prove. In his synonymy he refers directly to *Orchis psycodes* L. His *Platanthera crispa,* on the other hand, which he suggested was a natural hybrid, is equivalent to *H. psycodes,* to which species his material identified as *P. incisa* should also be referred. Lindley's material of *P. fimbriata* is conspecific with *H. psycodes,* and his *P. grandiflora* is simply *H. fimbriata.*

The difficulties are increased tenfold when it is realized that *H. psycodes* and *H. fimbriata* are so similar that they are distinguishable only by arbitrary rules. In the preparation of the Orchidaceæ for Gray's *New Manual* a conscientious effort was made to ascertain the distinctive characters of these two species. Although every conspicuous character was carefully studied it was found that the most reliable distinction was the depth of

H. psycodes

the fringe on the divisions of the labellum; in *H. psycodes* this being one-third the depth of the divisions or less, and in *H. fimbriata* one-third or more.

It may be found that my treatment of the synonymy is in part incorrect, but it is offered as a basis for further research. (Plate 66.)

NEWFOUNDLAND

Cochrane (3).—Wet meadow, Placentia, August 24, 1894, *B. L. Robinson & H. Schrenk* (no. 165) (2, 3, 4, 6).—Bottom lands, Manuel's River, August 8, 1894, *Robinson & Schrenk* (3).—Wet meadow, Shoal Point, Bay of Islands, July 16, 1895, *A. C. Waghorne* (no. 28) (4).

NOVA SCOTIA, Victoria County

Wet meadows and bogs, Baddeck, Cape Breton, July 18, 1883, *J. Macoun* (6); Baddeck, July 22, 1898, *Macoun* (6).—New Campbellton, July 23, 1897, *David White & Chas. Schuchert* (no. 27) (2, 6).

Cape Breton Co.: Boggy meadow, Sydney, August 18, 1902, *M. L. Fernald* (1, 3).

Guysborough Co.: Moist meadows, Boylston, August, 1892, *Dr. C. A. Hamilton* (2, 6).

PRINCE EDWARD ISLAND

Nictan Lake, July, 1884, *Geo. U. Hay* (6).—In marshes, Tracadie, August 3, 1888, *J. Macoun* (6).

NEW BRUNSWICK, Kent County

Bass River, July 30 and 31, 1868, *J. Fowler* (2, 3); August 9, 1871, *Fowler* (16).

Kings Co: Meadows, Norton, July 16, 1876, *G. U. Hay* (6).

St. John Co.: St. John, July 31, 1877, *Fowler* (4).

QUEBEC, Gaspé County

Deep cool grassy margins of brooks and swamps, Point Fame, August 1, 1882, *J. Macoun* (6).

Temiscouata Co.: Damp loam above edge of salt marsh, Cacouna, August 8, 1902, *M. L. Fernald* (3).—Riviere du Loup, August, 1902, *W. W. Eggleston* (no. 3006) (1).

Ottawa Co.: Along the Gatineau, above Wakefield, July 24, 1903, *Macoun* (6).

Argenteuil Co.: Greenville, July 18, 1890, *J. Fowler* (2).

ONTARIO, Carleton County

Swampy woods, Ottawa, July, 1886, *J. Macoun* (6).

Simcoe Co.: Damp thickets on meadows, Muskoka, July, 1892, *Spreadborough* (6).

Addington Co.: Mississippi Station, July 27, 1898, *Fowler* (4).

Lanark Co.: Almonte, July 12, 1898, *Fowler* (5).

Hastings Co.: Low meadows and borders of swamps, July 15, 1867, *Macoun* (6).—Low wet meadows, Belleville, July, 1865, *Macoun* (16).

Wellington Co.: Wet thicket, Snell Lake, July 16, 1889, *Jas. White* (6).

Huron Co.: Wingham, July 20, 1890, *J. A. Morton* (no. 2258) (2).

Waterloo Co.: Swamps, Elmira, July 14, 1899, *L. M. Umbach* (2).

Middlesex Co.: In bogs and swamps, London, June 11, 1879, *Millman* (6).

Welland Co.: Edge of marsh, Point Abino, August 18, 1897, *W. C. McCalla* (no. 385) (5, 6).—Moist woods, Niagara Falls, 1892, *Cameron* (6).

MAINE, Aroostook County

Rocky river shore at Horseback, St. Francis, July 20, 1904, *A. A. Eaton* (no. 194) (1).—Alluvial thicket, Beau Lac, August 14, 1902, *W. W. Eggleston & M. L. Fernald* (1).

Piscataquis Co.: River intervale, Foxcroft, July 18, 1895, *Fernald* (no. 298) (2, 3, 4).

Franklin Co.: Farmington and New Sharon, July 25, 1899, *Leland J. Spalding* (17).—Roadside ditch, South Chesterville, August, 1903, *Lillian O. Eaton* (1).—Swamp, Strong, August 1, 1902, *C. H. Knowlton* (1).

Oxford Co.: Meadows, Hartford, August, 1885, *J. C. Parlin* (3).

Kennebec Co.: Meadow, Fayette, August, 1903, *L. O. Eaton* (1).

Androscoggin Co.: Meadows, East Auburn, July, 1896, *E. D. Merrill* (no. 1000) (2).

Cumberland Co.: August 6, 1895, *E. E. Gayle* (no. 853) (2).

York Co.: Alder swamp, York Harbor, August 10, 1901, *F. Tracy Hubbard* (1).—Seabury, July 7, 1896, *Hubbard* (1).—Parsonsfield, August 10, 1902, *Florence L. Gerrish* (1).

NEW HAMPSHIRE, Coos County

Berlin, July 24, 1901, *Tinnie Wheeler* (3).

VERMONT, Orleans County

Dry roadside, Brownington, July 26, 1904, *A. A. Eaton* (no. 234) (1).

H. psycodes

Caledonia Co.: West Barnet, August 10, 1892, *Dr. F. Blanchard* (4).—Barnet, August 10, 1892, *Mrs. A. F. Stevens* (2).—Wet places, Peacham, July 27, 1884, *Dr. Blanchard* (2); August 10, 1892, *Mrs. A. F. Stevens* (2).—Groton, July, 1892, *Dr. F. Blanchard* (4).—Lyndonville, July 27, 1873, *J. W. Congdon* (2).—Newark, July 16 and 17, 1887, *Faxon* (3).

Addison Co.: Wet grounds, Starksborough, July 20, 1876, October 11, 1878 (fruit), *C. G. Pringle* (7).—Goshen, July 26, 1903, *W. W. Eggleston* (no. 3191) (1, 3).—Middlebury, August 19, 1878, *E. Brainerd* (5); July 31, 1902, *Brainerd* (3); August 2, 1880, *Thos. E. Boyce* (1).—East Middlebury, July 25, 1903, *Eggleston* (1).

Bennington Co.: Manchester, July 25, 1898, *Miss M. A. Day* (no. 318) (3).—Wet meadows, Pownal, August 5, 1901, *A. L. Andrews* (3).

Windham Co.: Westminster, 1901, *W. H. Blanchard* (3).

MASSACHUSETTS, Middlesex County

Reading, August 10, 1876, *W. H. Manning* (6).—South Framingham, July 27, 1890, *E. L. Sturtevant* (4).—Ashland, July 23, 1878, *Thos. Morong* (2).

Berkshire Co.: Abundant in East Mt. swamps, Great Barrington, August 1, 1894, *C. L. Pollard* (2).—Pittsfield, August 3, 1868, *J. H. Redfield* (4).

Hampshire Co.: Southampton, 1892, Hb. Chapman (5).—South Hadley, 1887, *A. C. Cook* (2).

Suffolk Co.: Brookside, near Humphrey's Avenue, West Roxbury, August 15, 1854, *Wm. Boott* (3).

Norfolk Co.: Brook running into Muddy Pond, Hyde Park, August 6, 1889, *Faxon* (3).

Bristol Co.: North Easton, 1889, *Carl Blomberg* (1); 1893, *Ames* (1); August 1, 1894, *Ames* (1); July, 1899, *A. W. Jacobson* (1); July 27, 1901, *R. G. Leavitt* (1, 5).

Plymouth Co.: Low woods, Scituate, August 13, 1899, *E. F. Williams* (3).

RHODE ISLAND, Providence County

Providence, 1846, *Geo. Thurber* (3).

CONNECTICUT

1857, (D. C.) *Eaton* (3).

Tolland Co.: Coventry, August 3, 1891, *Gertrude Hakes* (2).—Somers, August 16, 1901, *A. W. Driggs* (3).

Hartford Co.: Hartford, August 2, 1900, *A. W. Driggs* (3).—Swampy meadow, Churchill Street, Southington, August 5, 1900, *C. H. Bissell* (3); bogs, frequent, Southington, August 14, 1897, *Bissell* (5). *H. psycodes*

Fairfield Co.: Low grounds, infrequent, Bridgeport, July 22, 1892, *E. H. Eames* (2).—Weston, August 13, 1885, *A. L. Winton, Jr.* (2).

NEW YORK, Essex County

July 31, 1893, *Miss Fanny Page Robinson* (2).—Keen Valley, August 1, 1891, *Hermann Schrenk* (4).

Jefferson Co.: Evans Mills, August 6, 1879, *Lester F. Ward* (2).

Herkimer Co.: Border of marshes, Litchfield, August 3, 1901, *Dr. J. V. Haberer* (no. 887) (3).

Saratoga Co.: Border of the pond above the northwest corner of Stillwater village, 1867 (?), *Dr. Asa Fitch* (10).—Bear Pond, French Mt., July 27, 1899, *Stewart H. Burnham* (1).

Oneida Co.: Along Bear Creek, White Lake, Forestport, July 12, 1903, *Dr. J. V. Haberer* (no. 2679) (1).

Onondaga Co.: Near Syracuse, July, 1895, *M. L. Overacker* (5).

Yates Co.: Penn Yan, *T. Marshall Fry* (1).

Chenango Co.: Oxford, July 12, 1884, *F. V. Coville* (2).—Bainbridge, July 20, 1897, *D. LeRoy Topping* (2).

Tompkins Co.: Little Swamp, north part of Caroline, August 1, 1885, *O. E. Pearce* (2).

Schuyler Co.: Cayuta Lake, July 30, 1878, *Wm. Trelease* (4).

Delaware Co.: North Harpersfield, August 6, 1897, *Topping* (2).

NEW JERSEY, Sussex County

Stockholm, August 10, 1894, *Wm. M. Van Sickle* (2).—Wet woods, Cranberry Lake, July 31, 1904, *Kenneth K. Mackenzie* (no. 820) (1).

Essex Co.: Franklin, August, 1874, *H. H. Rusby* (10).

Union Co.: Summit Mt., July 29, 1898, *John C. Buchheister* (1).

PENNSYLVANIA, Luzerne County

Lily Lake, July 29, 1889, *A. A. Heller* (3).

DELAWARE, Newcastle County

Woodland swamp near Wilmington, June, 1860, *Wm. M. Canby* (16).

DISTRICT OF COLUMBIA

Indian River, August 6, 1879 (2).

VIRGINIA, Grayson County

Slope of Mt. Rogers, 4800–5000 ft., June 29, 1892, *John K. Small* (2, 3, 4).

H. psycodes NORTH CAROLINA, Mitchell County

Roandale Farm, June 24, 1895, *A. G. Wetherby* (no. 160) (2).—North side of Roan Mt., 5000 ft., July 7, 1902, *W. A. Cannon* (no. 60) (2); woodlands, Roan Mt., June, 1868, *Wm. M. Canby* (16).

Swain Co.: Ravines, 4000 ft., July 16, 1891, *Beardslee & Kofoid* (3).

OHIO, Cuyahoga County

Near Cleveland, *Wm. Krebs* (1).

Medina Co.: Swamps, Brunswick, July, 1897, *G. B. Ashcroft* (5).

Summit Co.: Copley Swamp, Akron, July 21, 1889, *Dr. Kent O. Foltz* (2).

MICHIGAN, Keweenaw County

Clifton, June, 1884, *O. A. Farwell* (11).

Delta Co.: Escambia, *Henry H. Babcock* (2).

Kent Co.: Grand Rapids, June 22, 1895, *W. E. Mulliken* (5).

Jackson Co.: Rich woods, July 3, 1896, *S. H. & D. R. Camp* (5).

Wayne Co.: Palmer Park, Detroit, August 1, 1903, *O. A. Farwell* (11).

Cass Co.: July 30, 1886, *H. J. Webber* (4).

INDIANA, Steuben County

East side of Clear Lake, in low thick woods, July 24, 1904, *Chas. C. Deam* (1).

ILLINOIS

M. S. Bebb (3).

WISCONSIN

Chippewa River, 1864, *T. J. Hale* (16).—Black River, 1861, *Hale* (3).—1861, *Hale* (4).

Polk Co.: Wet thickets, August, 1892, *H. F. Burglehaus* (4, 6).

Brown Co.: July 20, 1878, *J. H. Schuette* (1).—*Flint D. Clark* (8).—Peaks Point, Green Bay, July 24, 1891, *J. H. Schuette* (1).—Scott, near Comfort, August 4, 1901, *Schuette* (1).—Marsh meadow on the bay, July 20, 1878, *Schuette* (1).

La Crosse Co.: La Crosse, *L. H. Pammel* (3).

Milwaukee Co.: Milwaukee, *I. A. Lapham* (4).

MINNESOTA, St. Louis County

Fond du Lac, July, 1889, *F. F. Wood* (no. 393) (2).

Millelacs Co.: Milaca, July, 1892, *E. P. Sheldon* (2, 5, 14).

Chisago Co.: Chisago City, July 29, 1891, *J. H. Sandberg* (no. 679) (2).—Center City, August, 1892, *B. C. Taylor* (5, 14).

Hennepin Co.: Bogs, Fort Spelling, July 20, 1888, *Dr. W. H. Forwood* (2).

IOWA, Fayette County

H. psycodes

"Rare, only one specimen reported before in Iowa," Fayette, July, 1893, *B. Fink* (2).

× *H. Andrewsii*

× **Habenaria Andrewsii** *White*, ex Niles Bog-trotting for Orchids 258, fig. (1904); *Ames*, in Gray's Man. ed. 7, 311 (1908). —**H. psychodes × lacera** *Andrews*, in Rho. 2: 114 (1900), 3: 246 (1901); *Ames*, in Rho. 5: 263 (1903); *Eggleston*, in Rho. 6: 139 (1904).

"Lower leaves as in *H. lacera* length to 15 cm., width to 3 cm., ratio 5–7: 1. Raceme oblong, loosely fewer-flowered. Flowers white tinted rose to light rose-purple. Sepals round-oval, obtuse, lateral deflexed, plane, vertical. Petals cuneate-spatulate, obtuse or slightly retuse, denticulate above, slightly surpassing upper sepal in ratio of about 6: 5. Average width of lip about 12 mm. Divisions narrow-cuneate, deeply cleft as in *H. lacera*, few, averaging twice as many as in *lacera*, capillary, long. Arms of column as in *H. psychodes* or slightly more acute. Glands of pollen-masses slightly oblique, elliptical or slightly kidney-shaped. Pollen-masses intermediate in length, club-shaped; stalk ¾ length of mass of pollen or rather more; pollen greenish-yellow. Somewhat two-lobed projection from base of stigma not completely obstructing orifice of nectary in middle as in *lacera*. Spur longer than ovary, clavate, much enlarged below. Ovary short or intermediate, 9–12 mm. Locality—a very wet meadow in Pownal, Vermont, July 22, 1898 (*M. W. White* & *A. L. Andrews*), Aug. 5, 1901 (*A. L. Andrews*)." Andrews, *loc. cit.* (Plate 66.)

NOVA SCOTIA, Pictou County

Damp meadow near Pictou, July 12–18, 1901, *C. D. Howe* & *W. F. Lang* (no. 546) (3).

MAINE, Franklin County

South Chesterville, *Miss L. O. Eaton* (1).

× H. Andrewsii

VERMONT, Bennington County

Wet meadow, Pownal, August 5, 1901, *A. L. Andrews* (3); August 4, 1902, *Andrews* (1).

Windham Co.: Westminster, 1901, *W. H. Blanchard* (3).

H. fimbriata

31. **H. fimbriata** (*Dryander*) *R. Br.*, Prodr. 312 (1810), in Ait. Hort. Kew. ed. 2, 5: 193 (1813);[1] *Lodd.*, Bot. Cab. t. 552 (1818–24); Bot. Reg. t. 405 (1819); *Lindl.*, in Donn's Hort. Cant. ed. 10, 332 (1823); *Spreng.*, Syst. Veg. 3: 693 (1826); *Torr.*, Comp. 319 (1826); *Hook.*, Exot. Fl. 3: t. 224 (1826) in part; *Gray*, Man. ed. 5, 503 (1867), ed. 6, 510 (1890), Field, For. & Gard. Bot. ed. 1, 324 (1868), rev. ed. 409 (1895); *Willis*, Cat. N. J. 61 (1874); *J. Robinson*, Fl. Essex Co. 108 (1880); *Britton*, Prel. Cat. N. J. 94 (1881); Pl. Malden & Medf. 11 (1881); *Perkins*, Gen. Cat. Vt. 37 (1882); *Baker*, Fl. Waltham 24 (1883); *Jackson*, Fl. Worcester Co. 32 (1883); *Dudley*, Cayuga Fl. 96 (1886); *Dame & Collins*, Fl. Middlesex 103 (1888); *Perkins*, Fl. Vt. 278 (1888); *Bennett*, Pl. R. I. 48 (1888); *Macoun*, Cat. 4: 20 (1888), Check-list 53 (1889); *Britton*, Cat. N. J. 235 (1889); *Fernald*, in Portl. Cat. 64 (1892); *Baldw.*, Orch. N. Eng. 93, f. 28 (1894); *Rand & Redf.*, Fl. Mt. Desert 153 (1894); *Wats.*, Orch. Cult. ed. 2, 528 (1895); *Galen*, Fl. Lanc. Co. (1895), 15 (1898); *Deane*, Fl. Met. Park 79 (1896); *Mill. & Whit.*, Wild Fl. Northeast. St. 548, t. (1898); *Kearney*, in Bail. Cycl. Am. Hort. 2: 706 (1900); *Brainerd, Jones & Eggleston*, Fl. Vt. 30 (1900); *Mathews*, Field-book 92, fig. (1902).

?**Ophyrs fimbriata** *Walt.*, Fl. Carol. 221 (1788).

Orchis fimbriata *Dryander*, in Ait. Hort. Kew. ed. 1, 3: 297 (1789); *Poir.*, in Lam. Encyc. 4: 599 (1797); *Sw.*, in Act. Holm. 21: 207 (1800); *Willd.*, Sp. Pl. 4: 39 (1805); *Pers.*, Syn. 2: 505

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[1] Gray, Torrey and others refer this to *H. psycodes*.

(1807); *Martyn*, in Mill. Dict. ed. 9, 2: no. 44 (1807); *Barton*, Comp. Fl. Phil. 2: 137 (1818); *Torr.*, Cat. N. Y. 69 (1819); *Eaton*, Man. ed. 4, 375 (1824).—**O. grandiflora** *Big.*, Fl. Bost. ed. 2, 321 (1824), ed. 3, 343 (1840); *Oakes*, in Thompson's Vt. 199 (1853); *Wood*, Class-book ed. 41, 585 (1856); *Provanch.*, Fl. Canad. 2: 567 (1862). *H. fimbriata*

Habenaria grandiflora *Torr.*, Comp. 319 (1826); *Beck*, Bot. ed. 1, 349 (1833); *Darl.*, Fl. Cestr. ed. 1, 509 (1837); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840); *Dewey*, Herbaceous Pl. Mass. 197 (1840); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Britton & Br.*, Ill. Fl. 1: 466, f. 1111 (1896); *Clute*, Fl. Up. Susq. 106 (1898); *Meehan*, Monthly 9: 99 (1899); *Bailey*, in Rho. 3: 34 (1901); *Jelliffe*, Gibson's Nat. Orch. 56, pl. 25, f. 3 & 4 (1905); *Haberer*, in Rho. 7: 95 (1905). Not *H. grandiflora* Lindl., Wall. Cat. 7032 (1828).

Platanthera grandiflora *Lindl.*, Gen. & Sp. Orch. 294 (1835); *Correvon*, Orch. Rust. 171 (1893).—**P. fimbriata** *Lindl.*, Gen. & Sp. Orch. 293 (1835), excl. syn. in part (Lindley's plant collected by Goldie = *Habenaria psycodes*); *Gray*, Man. ed. 1, 472 (1848), ed. 2, 447 (1856), ed. 3, 477 (1859); *Darl.*, Fl. Cestr. ed. 3, 312 (1853); *Green & Congd.*, Class-book 203 (1855); *Tatnall*, Cat. Pl. Newc. Co. Del. 75 (1860); *Chapm.*, Fl. S. U. S. ed. 1, 461 (1860), ed. 2, 461 (1884), ed. 3, 487 (1897); *Paine*, Pl. Oneida Co. 84 (1865); Portl. Cat. 7 (1868); *Koehler*, Pract. Bot. 399, t. 13, f. 12 (1876); *Darrach*, Pl. Phila. 9 (1882); *Tracy*, Essex Fl. 81 (1892); *Correvon*, Orch. Rust. 170 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 607 (1899).—**P. fimbriata** *a* **grandiflora** *Hook.*, Fl. Bor. Am. 2 : 200 (1839).

Habenaria psycodes VAR. **grandiflora** *Gray*, in Sill. Journ. 38 : 310 (1840); *Torr.*, in Geol. & Nat. Hist. Surv. N.Y. 174 (1840.)

Platanthera psycodes VAR. **grandiflora** *Torr.*, Fl. N. Y.

2: 278 (1843); *Beck*, Bot. ed. 2, 348 (1856).—**P. incisa** *Lindl.*, in Paxt. Fl. Gard. 2: 24, f. 145 (1851–2); Fl. des Serres 8: 20, t. 3 (1852–3), not *Lindl.*, Orch.—**P. Bigelovii** *Wood*, Class-book 685 (1861), excl. syn.

Habenaria fimbriata f. albiflora *Rand & Redf.*, Fl. Mt. Desert 153 (1894).

Blephariglottis grandiflora *Rydb.*, in Britton's Man. 296 (1901); *Grout*, in Torreya 2: 47 (1902); *Small*, Fl. Se. U. S. 314 (1903), in Porter's Fl. Pa. 94 (1903).

"O. bulbis fasciculatis, nectarii cornu germinibus longiore: labio tripartito ciliari, petalis patentibus, foliis oblongis.

"Fringed Orchis.

"*Nat.* of Canada and Newfoundland.

"*Introd.* 1777, by William Pitcairn, M.D.

"*Fl.* July.

"Descr. *Caulis* erectus, glaber, ex ancipiti acute tetragonus. *Folia* caulina, nonnulla (3–5) alterna, sessilia, oblonga, acuta, glabra, integerrima, nervosa, carinata, basi vaginantia, biuncialia. *Spica* ovato-oblonga, multiflora. *Flores* e cæruleo purpurascentes. *Bracteæ* lanceolatæ, nervosæ, germinibus paulo longiores. *Petala* quinque, plana, longitudine æqualia, trilinearia: supremum seu dorsale ovatum, obtusum, erectum; lateralia exteriora ovata, acuta, patentissima; lateralia interiora oblonga, obtusa, juxta petalum dorsale erecta, infra medium dilatata, ibique denticulata, basi attenuata. *Nectarii Labium* petalis paulo longius, tripartitum: laciniæ latæ, cuneiformes, æquales planæ, ad medium subdivisæ in cilia subulata: laterales divaricatæ, intermedia patens. *Germen* semunciale." Dryander, *loc. cit.*

Reference should be made to the notes under *H. psycodes* for a full consideration of this species.

NEWFOUNDLAND

Banks of Exploits River, near mouth of Badger Brook, August 13, 1894, *B. L. Robinson & H. Schrenk* (2, 3, 4, 6, 7).

NOVA SCOTIA

Grand Narrows, Cape Breton Isl., July 27, 1898, *J. Macoun* (4, 6).

NEW BRUNSWICK

Wet meadows, Tobique River, August 2, 1884, *Geo. U. Hay* (6).

QUEBEC

In boggy woods, East Templeton, July 29, 1903 (6).

MAINE, Piscataquis County

Wet meadow near Fitzgerald Pond, near Moosehead Lake, July 6, 1895, *M. L. Fernald* (no. 274) (2, 3, 4).

Penobscot Co.: Very common in moist fields, sometimes 3 or 4 ft. high, Glenburn, *Aaron Young, Jr.* (3).

Franklin Co.: Open wet woods, South Chesterville, July 18, 1902, *C. H. Knowlton* (1); July, 1903, *L. O. Eaton* (1).

Oxford Co.: Grafton, August, 1888, *J. C. Parlin* (3) (*forma alba*).—Hartford, 1885, *Parlin* (3).—Black Brook, July 13, 1889 (11).

Hancock Co.: Meadow one mile north of Somesville, Mt. Desert, August 16, 1888, *J. H. Redfield* (4).—Bar Harbor, July 19, 1871, *Wm. Boott* (3).

Waldo Co.: Wet roadside, New Guinea, Islesboro, July 29, 1897, *F. Tracy Hubbard* (1).

Kennebec Co.: Winthrop, 1864, *E. L. Sturtevant* (4).—Augusta, July 20, 1886, *E. C. Smith* (4).—Manchester, July 18, 1878, *F. L. Scribner* (8).

Cumberland Co.: Falmouth, *Blake* (16).—Cape Elizabeth, July 21, 1901, *Dr. D. W. Fellows* (1).

York Co.: Kennebunk, July 20, 1878, *J. W. Chickering* (8).—In woods, growing in mud and water, North Parsonsfield, August 1, 1902, *F. S. Piper* (1).

NEW HAMPSHIRE, Coos County

Bogs, Crawford House, July 12, 1876, *J. W. Congdon* (7).—Dixville Notch, July 25, 1887, *Faxon* (3).—Meadow south of Crawford's, July 20, 1884, *Faxon* (3); Crawford Meadow, July 24, 1894, *Faxon* (3).

Grafton Co.: Flume House, July 19, 1885, *Faxon* (3).—Strawberry Hill, Bethlehem, July 21, 1891, *J. F. Collins* (3).

H. fimbriata

Belknap Co.: Edge of damp woods, Guilford, June, 1896, *Mrs. R. H. Carter* (5).

Hillsborough Co.: Manchester, June 6, 1899, *F. W. Batchelder* (3); July 20, 1899, *Batchelder* (3) (*forma alba*); July 20, 1899, *Batchelder* (3). —Milford, August, *John A. Wheeler* (1).

VERMONT, Orleans County

Willoughby Mt., Westmore, July 29, 1892, *H. H. Rusby* (10); summit of Willoughby Mt., July 24, 1866, *J. H. Redfield* (4).

Chittenden Co.: Smuggler's Notch, July 18, 1886, *Faxon* (3).

Rutland Co.: East Wallingford, alt. 2200 ft., July 7, 1898, *W. W. Eggleston* (no. 373) (3, 4, 5).

Windham Co.: Stratton Mt., July 4, 1895, *L. R. Jones* (5); *E. Brainerd* (1).—West Stratton, July 5, 1897, *Eggleston* (3).

MASSACHUSETTS

Wet meadows, 1892, Hb. Chapman (Biltmore dist. no. 4994 c) (5).

Essex Co.: Ipswich, Hb. Oakes (2, 3).—Salisbury, June, 1895, *A. A. Eaton* (1).

Middlesex Co.: In rich, deciduous, open woods, North Tewksbury, June 26, 1902, *Ames* (1).—Reading, June 22, 1897, *Chester C. Kingman* (5).—Swamps, Ashland, June 13, 1878, *Thos. Morong* (2).

Worcester Co.: Wet meadows and bogs, Dudley, June 17, 1899, *Leland J. Spalding* (17).—Drained swamp, Webster, June 19, 1905, *Spalding* (1). —Worcester, 1852, *A. Gray* (?) (3).—Berlin, *E. S. Wheeler* (3).—Shrewsbury, July 20, 1891, *Gertrude Hakes* (2).—Ashburnham, July 12, 1896, *Sydney Harris* (2); July, 1877, *H. H. Rusby* (10).—In woods, spur of Mt. Wachusett, Princeton, July 12, 1893, *C. A. Regester & J. F. Collins* (2).

Hampshire Co.: Northampton, *E. Hitchcock, Jr.* (3).—Wet woods, Amherst, June 18–19, 1870, *H. G. Jesup* (6, 16).

Norfolk Co.: Purgatory swamp, Dedham, June 14, 1889, *Faxon* (2, 3); June 27, 1888, *Faxon* (3); July 10, 1861, *Wm. Boott* (3).—Green Lodge, Dedham, June 15, 1896, *Geo. F. Goodno* (4); Dedham Road, July 5, 1901, *A. Clark & R. G. Leavitt* (1).—Blue Hill, Milton, June 23, 1889, *L. F. Ward* (2).—Canton, July 5, 1901, *Leavitt* (5).—Stoughton, June 12, 1905, *Leavitt* (1).

Bristol Co.; Swampy deciduous woods, Easton, July 17, 1903, *O. Ames*

& A. A. Eaton (1); July 24, 1903, *Ames* (1).—Fall River, August 4, 1902, *S. N. F. Sanford* (?) (3).

RHODE ISLAND, Providence County
Providence, *I. Metcalf* (3).
Kent Co.: Meadows, Warwick, July, 1883, *W. W. Bailey* (5).

CONNECTICUT, Hartford County
Wet sandy woods, Southington, June 28, 1901, *C. H. Bissell* (3).

NEW YORK, Herkimer County
Along head-waters of Black River, head of North Lake, Witmurt, July 13, 1902, *Dr. J. V. Haberer* (no. 879) (1, 3).
Oneida Co.: Along Bear Creek at White Lake Corners, Forestport, July 15, 1903, *Haberer* (no. 2680) (1).
Yates Co.: Penn Yan, *Dr. S(artwell)* (4).
Tompkins Co.: Lake Marsh, Dryden, June 26, 1878, *Wm. Trelease* (4).—Ithaca, June, 1879, *Rutherford P. Hayes* (2).
Delaware Co.: Fleischmanns, July 23, 1892, *Hermann Schrenk* (4).
Chemung Co.: Lowman's Swamp, July 3, 1892, *T. F. Lucy, M.D.* (no. 10,075) (5).

NEW JERSEY, Bergen County
Wet woods, Oradell, June 19, 1904, *Kenneth K. Mackenzie* (no. 765) (1).
Morris Co.: Wet woods, Budd's Lake, June 25, 1869, *C. F. Parker* (4).

PENNSYLVANIA, Pike County
E. A. Rau (nos. 838, 839) (2).
Union Co.: *H. R. Nott* (2).
Monroe Co.: Meadow, Tobyhauna Creek, Pocono Mt., August 8, 1867, *Wm. M. Canby* (16).

WEST VIRGINIA, Pocahontas County
June 20, 1896, *W. M. Pollock* (4); June 21, 1896 (5).

NORTH CAROLINA
Moist soil, Pisgah Mt., July 2, 1897 (Biltmore no. 4994b) (2, 3, 5).
Watauga Co.: Flat Top, Blowing Rock (14).
Mitchell Co.: Roan Mt., 6000 ft. alt., July 27, 1889, *F. L. Scribner* (8); 6300 ft., July 16, 1891, *J. K. Small & A. A. Heller* (no. 402) (2).
Yancey Co.: Moist soil along a mountain brook near Yeates Knob, June 24, 1898 (Biltmore no. 4994a) (5).
Buncombe Co.: Rich grounds on the wooded slopes of Craggy Mt.,

H. fimbriata

June 23, 1897 (Biltmore no. 4994) (2, 3, 4, 5); September 19, 1900, (fruit) (Biltmore no. 4994 d) (5).

TENNESSEE

Rich woods, Thunderhead Mt., east Tennessee, July, 1895, *Albert Ruth* (5).

H. peramœna

32. **H. peramœna** *Gray*, in Sill. Journ. 38: 310 (1840), Man. ed. 5, 503 (1867), ed. 6, 510 (1890), Field, For. & Gard. Bot. 325 (1868), rev. ed. 409 (1895); *Willis*, Cat. N. J. 61 (1874); *James*, Cat. Cincinnati 18 (1879); *Britton*, Prel. Cat. N. J. 94 (1881); *Gattinger*, Tenn. Fl. 33 (1887); *Britton*, Cat. N. J. 235 (1889); *Galen*, Fl. Lanc. Co. (1895), 15 (1898); *Britton & Br.*, Ill. Fl. 1: 466, f. 1113 (1896); *Kearney*, in Bail. Cycl. Am. Hort., 2: 706 (1900); *Mohr*, Pl. Life Ala. 455 (1901); *Gattinger*, Fl. Tenn. 62 (1901); *Mathews*, Field-book 92 (1902); *Jelliffe*, Gibson's Nat. Orch. 63, t. 27 (1905); *Ames*, in Gray Man. ed. 7, 311 (1908).

Orchis palmata peramœna, Caryophylli montani floribus, margine fimbriatis, ex Virginiâ *Pluk.*, Mant. 141, t. 434, f. 6 (1769).

Habenaria fissa *R. Br.*, in Hb. Banks, Prodr. 312 (1810); *Beck*, Bot. ed. 1, 349 (1833); *Darl.*, Fl. Cestr. ed. 1, 508 (1837). Not *H. fissa* Spreng. (= *H. psycodes*).

Orchis fissa *Pursh*, Fl. 2: 589 (1814); *Eaton*, Man. ed. 4, 375 (1824). Not of *Muhl.* nor *Willd.* (= *H. psycodes*).—**O. incisa** *Pursh*, Fl. 2: 589 (1814); *Nutt.*, Gen. 2: 189 (1818); *Eaton*, Man. ed. 4, 375 (1824). Not *O. incisa* Willd. (= *H. psycodes*).—**O. fusa** *Nutt.*, Gen. 2: 189 (1818).

Platanthera fissa *Lindl.*, Gen. & Sp. Orch. 294 (1835); *Steud.*, Nomencl. ed. 2, 2: 351 (1841); *Correvon*, Orch. Rust. 171 (1893).—**P. peramœna** *Gray*, Man. ed. 1, 473 (1848), ed. 2, 447 (1856), ed. 3, 447 (1859); *Chapm.*, Fl. S. U. S. ed. 1, 461 (1860), ed. 2, 461 (1884), ed. 3, 487 (1897); *Wood*, Class-book

H. peramœna

685 (1861); *Correvon*, Orch. Rust. 175 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 608 (1899), excl. syns. *Platanthera* and *Habenaria grandiflora.*—**P. psycodes** *Darl.*, Fl. Cestr. ed. 3, 312 (1853) in part?

Blephariglottis peramœna *Rydb.*, in Britton's Man. 297 (1901); *Small*, Fl. Se. U. S. 314 (1903), in Porter's Fl. Pa. 94 (1903).

Habenaria peramœna is readily distinguished from *H. fimbriata*, to which it bears a close resemblance, by the denticulate rather than fimbriate divisions of the labellum.

PENNSYLVANIA
1841, *McMinn* (2).—Alleghany Mts., *Nuttall* (13).
Chester Co.: Swamps, August, 1863, *W. M. Canby* (4, 6).—Meadows, August, 1867, *Canby* (4).
Lancaster Co.: Mouth of the Pequea, August 20, 1862, *T. C. Porter* (2, 3.)—Pleasantgrove, August 12, 1867, *J. J. Carter* (1).

DELAWARE, Newcastle County
July, 1864, *Canby* (?) (16).

MARYLAND
Glades, August, 1843 (3).
Cecil Co.: Risingsun, July 24, 1905, *J. J. Carter* (1).
Garrett Co.: Deer Park, August 2, 1879, *G. Guttenberg* (10).
Prince George Co.: Laurel, July, 1892 (2).—July, 1895 (2).—August 7, 1898, *Geo. Marshall* (2).

DISTRICT OF COLUMBIA
Flat near first lock, July 28, 1897, *E. S. Steele* (2).

NORTH CAROLINA
1841, *Met Curtis* (4).
Iredell Co.: Rare, Statesville, July, 1880, *Hyams* (2, 5).
Buncombe Co.: Roandale Farm, June 15, 1895, *A. G. Wetherby* (no. 189) (2).—Biltmore, August 8, 1894 (5); moist soil near Biltmore, August 3, 1898 (Biltmore no. 488b) (5).
Swain Co.: Great Smoky Mts., alt. 2000, August 15, 1891, *Beardslee & Kofoid* (3).

H. peramœna ALABAMA, Lauderdale County
Pruitton, June, 1896, ***John H. Harrison*** (12).

TENNESSEE
East Tennessee, ***C. C. Parry***, 1870 (2).
Sumner Co.: Mitchellville, September, 1883, ***Dr. A. Gattinger*** (8).
Robertson Co.: Cedar Hill, July 14, 1882, ***Gattinger*** (2, 8).
Benton Co.: Camden, July, 1892, ***F. Lamson-Scribner*** (8).
McNairy Co.: Bottoms, July 4, 1893, ***Samuel M. Bain*** (no. 458) (3).

KENTUCKY
Damp woods, 1840, ***C. W. Short*** (4).
Jefferson Co.: Wet lands about Louisville, 1835, ***Short*** (3).

WEST VIRGINIA, Upshur County
Near Bucklin, July 31, 1895, ***W. M. Pollock*** (2, 4).

OHIO, Hamilton County
Our most common species, in moist woods and meadows. Sometimes four feet high, ***Fernbank-ad ripas fluminis Ohio, prope*** North Bend, 1846, ***C. W. Short*** (3, 4).

INDIANA, Jefferson County
Hanover, August, 1876, ***A. H. Young*** (10).

ILLINOIS
July 18, 1892 (4).
Marion Co.: Salem, 1860, ***M. S. Bebb*** (3).
Jackson Co.: Carbondale, ***Geo. Vasey*** (3).
Union Co.: Cobden, July, ***F. S. Earle*** (1).

MISSOURI
St. Francis River, July 14, 1897, ***Savage & Stull*** (no. 751) (4).
Iron Co.: Wet ground, bank of creek, Pilot Knob, August 10, 1897, ***Colton Russell*** (4).
Green Co.: Common, Campbell, July 18, 1895, ***B. F. Bush*** (no. 619) (4, 5).
Butler Co.: Grassy places, July, 1893, ***H. Eggert.***
Ripley Co.: Sandy woods, Pleasantgrove, rare, July 17, 1897, ***Kenneth K. Mackenzie*** (no. 329) (4).—Poplar Bluff, July 10, 1897, ***A. S. Duckworth*** (2).

H. distans 33. **H. distans** *Griseb.*, Cat. Pl. Cub. 270 (1866); *Sauv.*, Fl. Cub. 233 (1873); *Chapm.*, Fl. S. U. S. ed. 2, 654 (1884), ed. 3, 488 (1897); *Reichb. f.*, in Ber. Deut. Bot. Gesell. 3: 274 (1885); *H. distans Kränzl.*, in Engl. Bot. Jahrb. 16: 61 (1893), Orch. Gen. et Sp. 1: 194 (1897); *Small*, Fl. Se. U. S. 315 (1903); *Urban*, in Symb. Antill. 4: 162 (1905); *Cogn.*, in Urban Symb. Antill. 6: 300 (1909).

"184. Habenaria distans Gr. radicellis villosis tuberiferis, caule basi foliato (1′ alto), foliis elliptico-oblongis acutis (4″–6″ longis), racemo paucifloro: floribus distantibus: bracteis membranaceis oblongo-lanceolatis ovario duplo brevioribus, perigonii segmentis exterioribus lateralibus reflexis ovato-lanceolatis (4‴ longis), superiori ovato obtusiusculo, interioribus bipartitis eorumque segmento anteriori falcato-lineari descendente posteriorem subæquante, hoc oblongo, labello ad basin trisecto: segmentis linearibus, lateralibus patentissimis incurvis, medio longiori, calcare filiformi descendente versus basin compresso-clavellato (8‴–10‴ longo) ovarium subæquante v. excedente.—Habenaria n. sp. Lindl. Orch. Wr.—Cuba or., pr. Monteverde (Wr. 1481) E." Griseb. *loc. cit.*

Habenaria jamaicensis Fawcett & Rendle is a closely allied species characterized in part by the short anterior divisions of the petals.

H. distans is an extremely rare plant in Florida, where it appears to have been collected only once, in 1878, by A. P. Garber. No other collection has been made in Florida of which I have any knowledge.

The Cuban specimens collected by Wright, which constitute the type of *H. distans*, are large plants very unlike the specimens from Florida.

FLORIDA, Lee County

Caloosa, August, 1878, *A. P. Garber* (1, 2, 3, 4, 5, 7, 16).

H. distans CUBA

Prope villam Monte Verde dictam, Cuba Orientali, January–July, 1859, *C. Wright* (no. 1481) (3, 4), (type).

Reported as follows:

PORTO RICO

Prope Mayaguez, in sylvis montis Mesa, 30, X, 1884, *Sintenis* (no. 501).

HAYTI

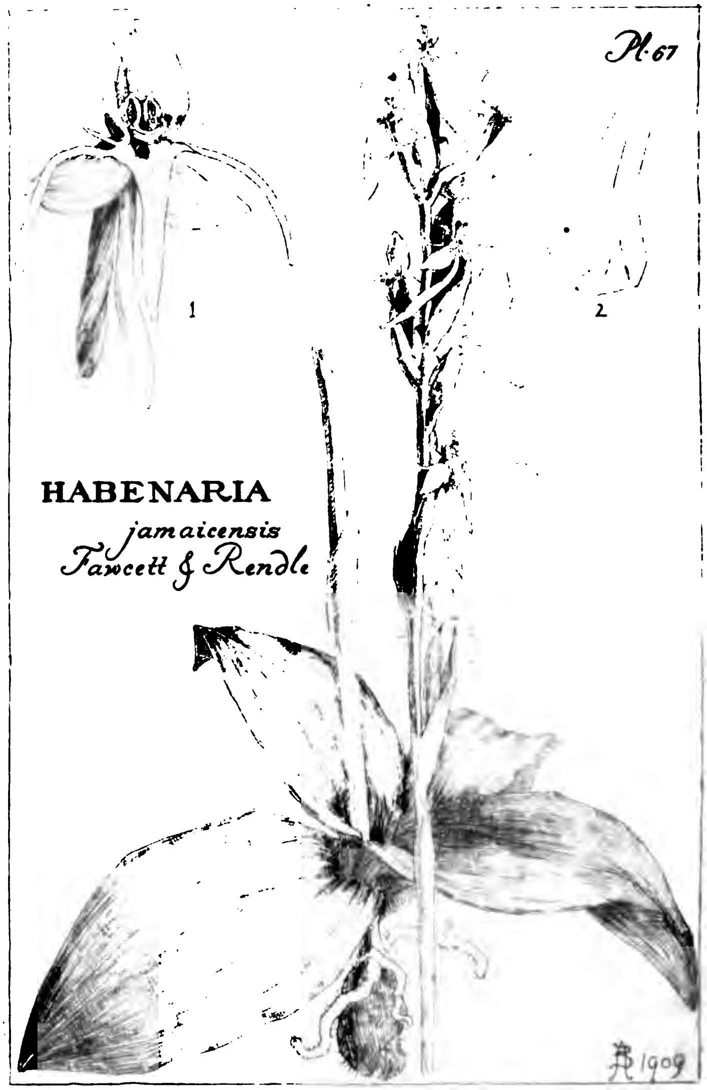
Cf. Urban, *loc. cit.*

H. jamaicensis

34. **H. jamaicensis** *Fawcett & Rendle*, in Journ. Bot. 47: 126 (1909).—**H. distans** VAR. *β* **jamaicensis** *Cogn.*, in Urban Symb. Antill. 6: 300 (1909).

"Caulis basi paucifoliatus. Folia 3, 4–ve, inferiora rotundato-ovalia, obtusissima, superiora ovalia, acuta; amplexicaulia, brevissime vaginata. Racemus laxiter 4–12-florus. Bracteæ membranaceæ, ovato-lanceolatæ lanceolatæve, acutæ acuminatæve, amplexicaules; steriles 2–4, plus minus distantes, breviter amplexicaules; florales ovario subæquilongæ. Sepala, dorsale ovato-suborbiculare, obtussisimum, cucullatum; lateralia deflexa, semi-ovata, subfalcata, obtusa, apiculata, dorsali paullo longiora. Petala 2-partita, partitionibus valde inæqualibus; posteriore oblongo-lanceolato, falcato, acuto, conniventi, sepalo dorsali paullo breviore; anteriore subulato, erecto, brevi, quam posterior multoties breviore. Labellum usque ad basin 3-partitum, medio lobo lineari-ligulato, lobis lateralibus plerumque breviore; lobis lateralibus filiformibus, erectis, quam petalorum partitiones posteriores multo longioribus; calcare pendulo, tenui, leviter clavato, obtuso, ovario subæquilongo; processubus stigmaticis brevibus, truncato-rotundatis; antheræ canalibus subæqualibus, leviter curvatis; staminodibus breviter triangularibus.

"Plant 1.5–3 dm. l. Leaves 3–9 cm. l., 1.5–4.5 cm. br. Raceme 4–15 cm. l. Bracts, sterile 5–2 cm. l., floral 2.5–1.5 cm. l.



Pl. 67

HABENARIA
jamaicensis
Fawcett & Rendle

PLATE 67. *Habenaria jamaicensis*

Plant, natural size, drawn from a dried specimen collected in Jamaica by W. Harris (no. 10,499). 1. Flower, to show comparative lengths of the divisions of the petals and labellum. 2. Petal. The flower and petal drawn, enlarged, with the aid of the camera lucida.

H. jamaicensis

Pedicels about 5 mm. l. Flowers greenish. Sepals, dorsal 6–7 mm. l., 4.5–6 mm. br., lateral 6.5–9 mm. l., 3.5–4 mm. br. Petals, posterior segment 5.5–7 mm. l., 1.5–2 mm. br.; anterior segment 1.5–2 mm. l. Lip, middle lobe, 6.5–10 mm. l., about 1 mm. br.; lateral 9–12 mm. l.; spur 13–16 mm. l.

"*Hab.*—On rocky, or clayey, shady banks, in flower Dec.–April, Mt. Hybla, 4000 ft., 7851; Clydesdale, 4000–4500 ft., 7854; Moody's Gap, 3000 ft., 7768; near Cinchona, 4500 ft., 10,449;[1] *Harris.*

"Resembles *H. distans* Griseb. in the aggregation of the leaves at the base of the stem, and generally in the shape of the leaves, though those of *H. distans* are longer. Grisebach's species also differs in the bracts being about as long as, or longer than, the flower; and in the anterior segment of the petal being about equal to the posterior." Fawcett & Rendle, *loc. cit.*

The very short anterior division of the petals is characteristic, and readily distinguishes *H. jamaicensis* from *H. distans.* Cogniaux is inclined to regard this as a variety of *H. distans.*

JAMAICA

4500 ft. alt. amongst mosses on rocky banks, near Cinchona, July 4, 1908, *W. Harris* (no. 10,499) (1).—4000 ft. alt. growing under shade among mosses, flowers greenish, Clydesdale, February 15, 1900, *Harris* (no. 7854) (22).—4000 ft. alt., growing in damp clayey land, Mt. Hybla, February 8, 1900, *Harris* (no. 7851) (22).

H. Türckheimii

35. **H. Türckheimii** *Schltr.*, in Fedde Rep. Nov. Spec. Veg. 2: 129 (1906).

"Terrestris, erecta, simplex, c. 20 cm. alta; foliis basilaribus 5–6, plantagineo-rosulatis, ellipticis acuminatis, glabris, textura tenuibus, usque ad 8.5 cm. longis, medio fere vel infra medium

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[1] Typographical error in original description. Read 10,499.

H. Türckheimii

usque ad 3.5 cm. latis; caule tereti glabro, substricto, brevi, foliis basilaribus exceptis vaginis foliaceis acuminatis, erectis, plus minusve approximatis obsesso; racemo sublaxe multifloro (c. 20) subelongato, c. 12 cm. alto; floribus erecto-patentibus illis *H. entomanthæ* Ldl. fere æquimagnis, viridibus; sepalo intermedio ovato apiculato, concavo, glabro, 0.7 cm. longo, lateralibus patulis subfalcatis oblique lanceolato-ellipticis acuminatis, glabris, intermedio fere æquilongis; petalis bipartitis, glabris, partitione postica lineari-falcata acuta, sepalo intermedio æquilonga, partitione antica filiformi c. 1.1 cm. longa; labello tripartito, glabro, partitionibus lateralibus partitioni anticæ petalorum similibus, c. 1.2 cm. longis, filiformibus, partitione intermedia anguste lineari obtusiuscula c. 0.8 cm. longa, calcare cylindrico dimidio anteriore paulo crassiore subacuto, decurvo, 1.5 cm. longo, glabro; anthera apice emarginata, glabra, rostelli lobo intermedio triangulo obtuso, dimidium loculorum altitudine vix excedente, canalibus porrectis, brevibus; processibus stigmatiferis crassiusculis, truncatis, canalibus antheræ brevioribus; ovario glabro cylindraceo, c. 1 cm. longa.

"Guatemala: In Felsspalten bei Cubilguitz, c. 350 m. ü. M. —H. v. Türckheim no. 766 (It. II), blühend im August, 1903.

"Mit *H. entomantha* Ldl. verwandt. Habituell recht verschieden von allen Arten dieser Gruppe." Schltr. *loc. cit.*

GUATEMALA, Alta Verapaz

Perigon grün, Cubilquitz, alt. 350 m., August, 1903, *H. von Türckheim*, J. D. Smith distr. (no. 8588) (1); November, 1901, *Türckheim*, J. D. Smith distr. (no. 8308) (1).

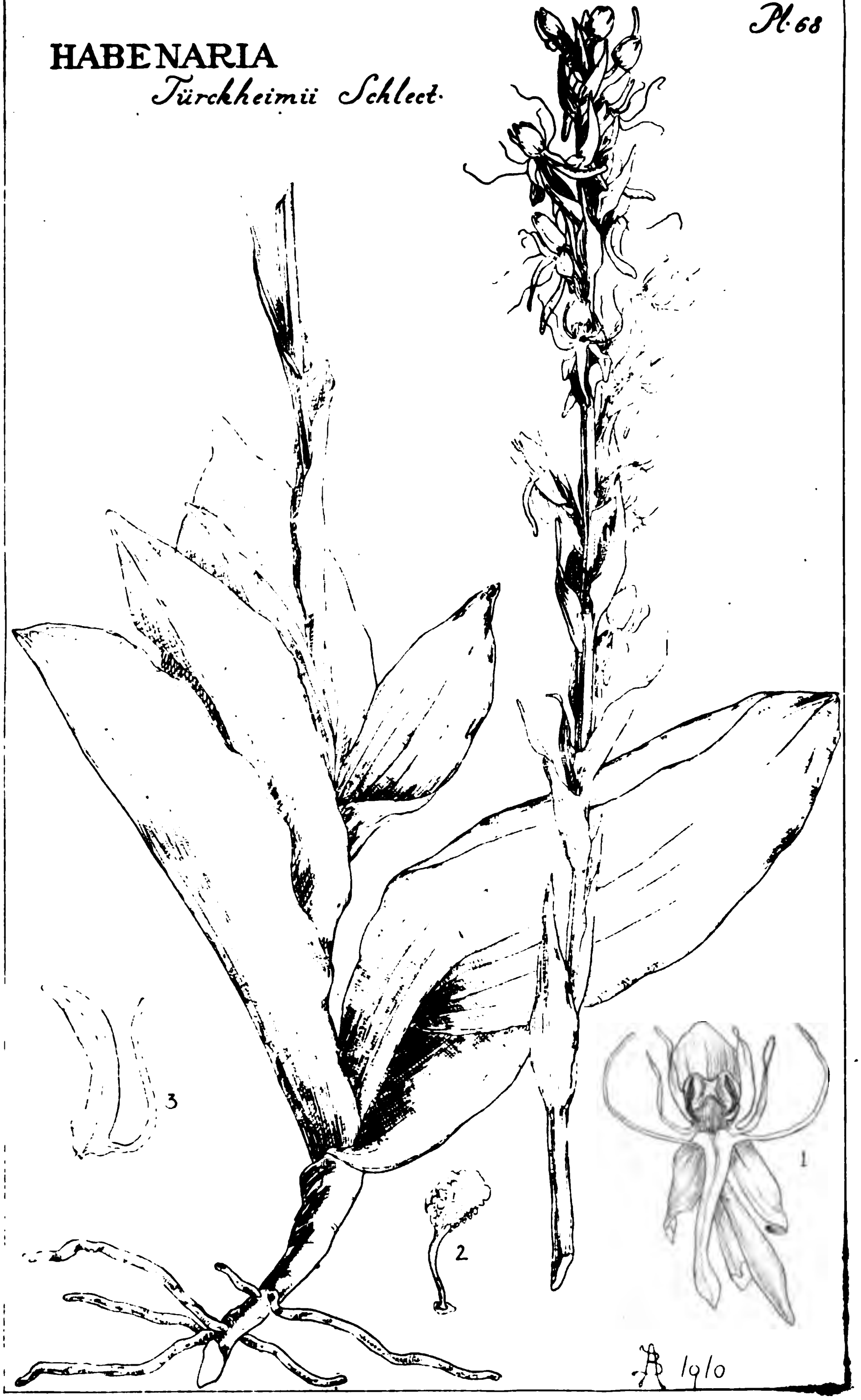
In my herbarium there are two specimens of *Habenaria Türckheimii* from Guatemala. One is presumably a duplicate from the same collection in which the type was found. The

PLATE 68. *Habenaria Türckheimii*

Plant, natural size, drawn from a dried specimen collected by H. von Türckheim in Guatemala. 1. Flower. 2. Pollen-mass. 3. Petal. Flower and parts drawn, enlarged, with the aid of the camera lucida.

Pl. 68

HABENARIA
Türckheimii Schlecht.



H. Türckheimii

leaves are approximate, six or more in number, chartaceous, and basal, and somewhat similar to the leaves of *H. distans* in their arrangement. The accompanying plate was prepared from this specimen.

H. setifera

36. **H. setifera** *Lindl.*, in Ann. Nat. Hist. 4: 331 (1840); *Reichb. f.*, in Linnæa 18: 407 (1844); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 118 (1893); *Cogn.*, in Mart. Fl. Bras. 3: pt. 4, 62 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 285 (1898); *Cogn.*, in Urban Symb. Antill. 6: 308 (1909). —**H. spathacea** *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 29 (1845); *Reichb. f.*, in Bonpl. 2: 10 (1854); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Wats.*, in Proc. Am. Acad. 22: 455 (1887); *Kränzl.*, in Engl. Bot. Jahrb. 16: 95 (1893), Orch. Gen. et Sp. 1: 247 (1897).—**H. pauciflora** *Kränzl.*, in Engl. Bot. Jahrb. 16: 99 (1893), Orch. Gen. et Sp. 1: 254 (1897) in part, as to Palmer's plant; *Cogn.*, in Mart. Fl. Bras. 3: pt. 4, 37 (1893) as to Palmer's plant.

"HABENARIA (A. § 1. xx. b.) *setifera;* foliis ensiformibus carinatis erectis apice incurvis setiferis, caule foliato 1–2-floro, bracteis inflatis ovario longipedunculato brevioribus, petalis bipartitis: laciniâ anteriore lineari posterioris longitudine, labelli tripartiti laciniis linearibus carnosis intermediâ longiore, calcare pendulo clavato pedunculo subæquali.—*Mexico*, ad Choapam, inter gramina, Junio, Hartweg.

"A plant allied to *H. macroceras*, of which it has much the habit." Lindl. *loc. cit.*

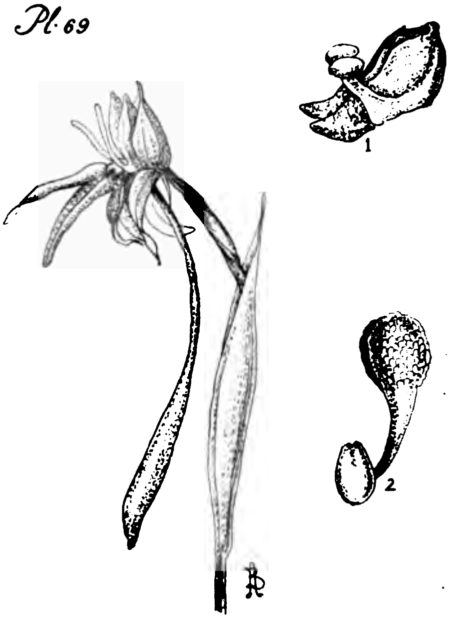
Habenaria setifera, *H. spathacea* and *H. pauciflora* are very closely allied species, if not conspecific. In the synonymy of *H. setifera* I have included *H. spathacea*, as an examination of the types did not reveal any marked differences between these

ORCHIDACEÆ

PLATE 69. *Habenaria setifera*

Flower, much enlarged. 1. Column. 2. Pollen-mass. Flower and parts drawn from a photograph of the original drawing by Richard preserved in the Muséum d'Histoire Naturelle de Paris. Richard's drawing was prepared, presumably, from a specimen collected in Mexico by Linden.

Pl. 69



HABENARIA
setifera Lindl.

two species. It is highly probable that *H. pauciflora* should include both *H. setifera* and *H. spathacea*, but my material has been insufficient for a definitive conclusion regarding *H. pauciflora*. *H. pauciflora* appears to be confined to tropical South America.

H. setifera

MEXICO, Durango
August 16, 1897, *J. N. Rose* (no. 2326) (2).
San Luis Potosi: Hillsides, Las Canoas, August 8, 1891, *Pringle* (no. 5024) (3, 7).
Jalisco: Rio Blanco, June–October, 1886, *Dr. Edw. Palmer* (no. 342) (2, 3, 4, 16).—Plains near Guadalajara, September 10, 1890, *Pringle* (no. 3571) (3); grassy slopes of rocky hills, August 21, 1893, *Pringle* (no. 4507) (2, 3, 4, 7); September 30, 1903, *J. N. Rose & Jos. H. Painter* (no. 7485) (2).
Vera Cruz: *Terrestre dans les savannahs*, Zacuapan, *petales d'un vert jaunâtre; labelle, blanc, fleur en juillet*, *Linden* (21), (type of *H. spathacea* Rich. & Gal.).
Oaxaca: Choapám, *Hartweg* (20), (type).

TRINIDAD
St. Martha, *Purdie* (20).

VENEZUELA
Prope coloniam Tovar, Caracas, 1856–7, *Fendler* (no. 1409) (3), det. Lindl.

PERU
Tarapota, *Spruce* (no. 4953) (20).

Reported as follows:

COLOMBIA
Antioquia, *Kalbreyer* (no. 1915).

37. **H. mesodactyla** *Griseb.*, Fl. Br. W. Ind. 644 (1864); *Kränzl.*, in Engl. Bot. Jahrb. 16: 101 (1893), Orch. Gen. et Sp. 1: 256 (1897); *Cogn.*, in Urban Symb. Antill. 6: 302 (1909).

H. mesodactyla

"225. H. mesodactyla, *Gr.* (*n. sp.*). Slender; *leaves linear-setaceous*, distant; flowers very distant in a 3–5-flowered spike:

H. mesodactyla

bracts ovate-lanceolate, acuminate, *little exceeded by the* incurved *ovary;* perigonial divisions exterior lateral reflexed, oblong-lanceolate, superior deltoid, 2 interior 2-partite: their anterior segments setaceous, twice as long as the linear posterior ones; *lip 3-partite: segments filiform: middle twice as long as the lateral ones: spur little shorter than the ovary,* filiform, somewhat clavate, *descending;* appendages of the stigma short, thickish, rounded.—Nearly allied to the preceding,[1] with which it grows intermingled (*Cr.*), and some characters depend perhaps upon the more advanced state of development in which this was collected. Habit and proportions the same, but stem rather higher, flowers more distant, and lip-segments narrower.—Hab. Trinidad, *Cr.*, in savannahs, Piarco." Griseb. *loc. cit.*

I have seen no specimens of this species. In my herbarium there is an excellent sketch of the material in the Kew Herbarium, for which I am indebted to the kindness of Dr. D. Prain. This sketch shows a slender plant with wand-like stems and linear, bract-like leaves. The inflorescence is loose, somewhat one-sided, and few-flowered. Contrary to the description published by Grisebach, the middle division of the labellum, as shown by the sketch, is much shorter than the lateral divisions. The material from which the sketch was prepared was collected in Trinidad by Dr. Crueger, and was used by Grisebach in his work on the *Flora of the British West Indian Islands;* consequently the discrepancy between the description and the material at Kew is of unusual interest.

Kränzlin, in *Orchidacearum Genera et Species*, states that the anterior division of the petals is longer than the posterior division, but not twice longer, as described by Grisebach, and he describes the labellum as tripartite, with the middle division about twice as long as the lateral ones. (Plate 70.)

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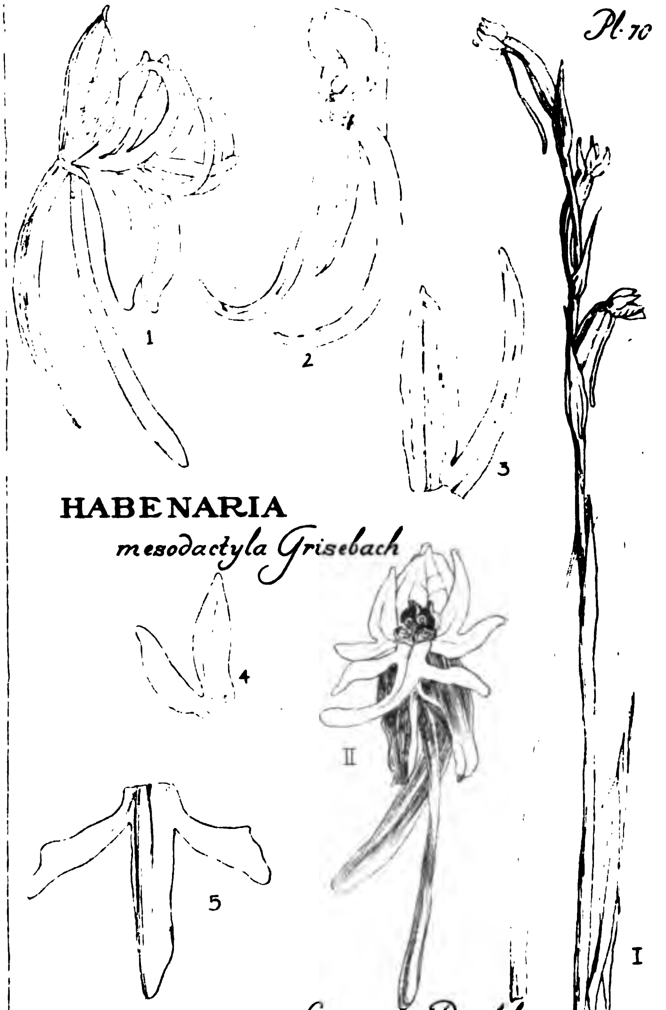
[1] *H. setacea*, which Cogniaux has described as *H. Cruegeri*.

Pl. 70



HABENARIA *mesodactyla Grisebach*

HABENARIA *Leprieuri Reichb.*

ORCHIDACEÆ

PLATE 70

I. *Habenaria mesodactyla*. Drawn from a sketch, prepared by M. Smith, of the specimens collected in Trinidad, British West Indies, by Dr. Crueger (no. 66), and preserved in the herbarium at the Royal Botanic Garden, Kew. 1. Flower. 2. Labellum and column. 3. Petal.

II. *Habenaria Leprieuri*. Flower drawn from a dried specimen collected in Trinidad, British West Indies, by W. E. Broadway. 4. Petal. 5. Labellum. Flower and parts drawn, enlarged, with the aid of the camera lucida.

H. Leprieuri 38. **H. Leprieuri** *Reichb. f.*, in Linnæa 19: 376 (1847), in Walp. Ann. 1: 798 (1848), Otia bot. Hamb. 2: 50 (1881); *Warm.*, Symb. Fl. Bras. pt. 30, 91, t. 8, f. 1 (1884–5); *Kränzl.*, in Engl. Bot. Jahrb. 16: 101 (1893), Orch. Gen. et Sp. 1: 256 (1897); *Cogn.*, in Mart. Fl. Bras. 3, pt. 4, 47 (1893), in Urban Symb. Antill. 6: 301 (1909).

"12. *Habenaria Leprieuri:* spica pauci-(2–6-)flora, floribus distantibus, bracteis ovatis acutis ovario (in speciminibus observatis prope maturo) brevioribus, perigonii phyllis externis ovatis obtusiusculis, internis minoribus falcatis, cum phyllo superiore galeatis, labello tripartito, laciniis lateralibus filiformibus divaricatis, media lanceolata obtusiuscula, lobis lateralibus subæquali, calcare filiformi ovario amplo apice breviter attenuato multo breviore. (Lindl. Gen. et Orch. ad A. § 2. C.)

"Zierliche, sehr zarte, fusshohe, steif aufgerichtete Pflanze mit 3–4 linealen, spitzen Blättern, durch das Trocknen schwarz.

"Cayenne, Leprieur. 1839! Im Herbar des Hern. von Delessert und im eignen, von demselben mitgetheilt." Reichb. f. *loc. cit.*

I place here specimens gathered in Trinidad (British West Indies) by W. E. Broadway. The flowers agree well with the figure in Warming's *Symbolæ ad Floram Brasiliæ* and with the description published by Cogniaux in *Mart. Fl. Bras.* The setaceous, or narrowly linear, leaves are distinctive when compared with other species in our range. The raceme, however, of one of Broadway's specimens is composed of twenty or more flowers, differing in this respect from the type. The number of flowers may be extremely variable.

The general habit of Broadway's material suggests *H. mesodactyla*, but the flower is unlike the drawing prepared from the specimens preserved in the Kew Herbarium. The material from which my illustration is taken is presumably referable to *H. Leprieuri*. Broadway's specimens are of unusual interest, as they exhibit a wide range of variation in the form of the inflorescence and in the relative proportions of the divisions of the petals and labellum. Cogniaux's observations tend to show that great variation may be expected in the anterior division of the petal, this being either well developed or much reduced. Warming's figure shows the anterior division of the petal to be more slender than in the material chosen for illustration here. (PLATE 70.) *H. Leprieuri*

TRINIDAD
Purdie.— *W. E. Broadway* (1).

FRENCH GUIANA
Leprieur (no. 231).

BRAZIL, MINAS GERAËS
Lagoa Santa, *Warming*.

39. **H. Cruegeri** *Cogn.*, in Urban Symb. Antill. 6: 302 (1909). —**H. setacea** *Griseb.*, Fl. Br. W. Ind. 644 (1864), not *Lindl.* *H. Cruegeri*

"Tuberidiis parvis, ovoideo-oblongis, villosis; caule subfiliformi, breviusculo, basi vaginato, supra sparse vaginato; foliis erectis, rigidiusculis, lineari-setaceis, non carinatis, basi longiuscule vaginantibus; racemo breviusculo, laxe 5–8-floro; bracteis membranaceis, ovato-lanceolatis, acutissime longeque acuminatis, leviter ventricosis, ovario circiter æquilongis; floribus subsecundis; sepalis trinerviis, dorsali ovato, obtuso, lateralibus paulo longioribus, deflexis, triangulari-lanceolatis, acutiusculis; petalis bipartitis, partitionibus æquilongis, sepalo dorsali paulo brevioribus, postica lineari-ligulata acuta, antica erecta setacea; labello carnosulo usque ad basin tripartito, partitionibus subæqualibus, sepalis lateralibus æquilongis, anguste linearibus, lateralibus acutiusculis, intermedia vix latiore obtusa; calcare pendulo, filiformi-clavato, obtuso, ovario æquilongo; processubus stigmaticis brevibus, crassis, rotundatis.

H. Cruegeri “*Habenaria setacea Griseb.! Flor.* (*1864*), *p. 644* (*non Lindl.!*).

“Tuberidia obtusa, paulo obliqua, 10–12 mm. longa. Caulis strictus vel leviter flexuosus, teretiusculus, 12–35 cm. altus, ½–1 mm. crassus. Folia tenuiter trinervia, limbo 2–4 cm. longo basi 1–2 mm. lato, vagina 1–3 mm. longa. Racemus rectus, 3–8 cm. longus. Bracteæ adpressæ, basi amplexicaules, 8–13 mm. longæ. Flores erecto-patuli, virescentes. Ovarium anguste lineari-fusiforme, leviter arcuatum, 10–11 mm. longum. Sepala submembranacea, dorsale satis concavum, 3 mm. longum, 2 mm. latum, lateralia subplana, leviter obliqua, 3½–4 mm. longa, 1½ mm. lata. Petalorum partitiones subrectæ, 2½ mm. longæ. Labellum deflexum, partitionibus leviter divergentibus, 3½–4 mm. longis; calcar rectum, 1 cm. longum, inferne ⅓ mm. superne ⅔ mm. crassum. Capsula erecta, leviter arcuata, fusiformis, crasse 6-costata, 14–16 mm. longa.

“Hab. in Trinidad ad Aripo et Piarco, fl. et fr. V: Crueger n. 49 et 67.” Cogn. *loc. cit.*

Among the orchids collected by Crueger in Trinidad, and described by Grisebach in the *Flora of the British West Indian Islands*, there were two closely allied species of Habenaria, one of which Grisebach referred to *H. setacea*. Subsequent studies have proved that *H. setacea* does not come within our range. Professor Cogniaux has recently decided that Grisebach's *H. setacea* is an undescribed species; and in Urban's *Symbolæ Antillanæ* it appears under the name *H. Cruegeri*.

H. repens 40. **H. repens** *Nutt.*, Gen. 2: 190 (1818); *Elliott*, Sketch 2: 489 (1824); *Spreng.*, Syst. Veg. 3: 692 (1826); *Lindl.*, Gen. & Sp. Orch. 310 (1835); *Eaton & Wr.*, N. A. Bot. ed. 3, 260 (1840); *Steud.*, Nomencl. ed. 2, 1: 717 (1841); *Chapm.*, Fl. S. U. S. ed. 1, 461 (1860), ed. 2, 461 (1884), ed. 3, 487 (1897); *Darby*, Bot. S. St. 527 (1866); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *H. repens Wood & McCarthy*, Wilmington Fl. 50 (1886); *Kränzl.*, in Engl. Bot. Jahrb. 16: 185 (1893); *Cogn.*, in Mart. Fl. Bras. 3, pt. 4, 91 (1893); *Kränzl.*, Orch. Gen. et Sp. 1: 317 (1898), excl. Gardner no. 3990; *Mohr*, Pl. Life Ala. 455 (1901); *Rolfe*, in Hook. Ic. Pl. t. 2686 (1901); *Small*, Fl. Se. U. S. 315 (1903); *Harper*, in Plant World 6: 165 (1903); *Ames*, Orch. Fl. Fla. 11 (1904), Orchidaceæ fasc. 1: 51, t. 14 (1905); *Rusby*, in Journ. N. Y. Bot. Gard. 7: 112, f. 3 (1906); *Cogn.*, in Urban Symb. Antill. 6: 305 (1909).

Orchis lacera *Elliott*, Sketch 2: 484 (1824) in part (as to plant of Dr. Macbride from St. Stephens).—**O. repens** *Raf.*, Neogenyton 4 (1825) nomen sub Mesicera; *Wood*, Am. Bot. & Flor. 328 (1871).

Habenaria tricuspis *A. Rich.*, in Sagra Fl. Cub. 2: 249 (1850); *Griseb.*, Cat. Pl. Cub. 271 (1866); *Sauv.*, Fl. Cub. 233 (1873).

Platanthera repens *Wood*, Class-book 685 (1861).

Habenaria radicans *Griseb.*, Cat. Pl. Cub. 271 (1866) (Wright no. 3309).—?**H. maxillaris** *Reichb. f.*, Beitr. Orch. Cent. Am. 61 (1866), not *Lindl.*

"2. **repens.* Root creeping; leaves and bractes lanceolate, acute; lip 3-parted, lateral segments setaceous; spur scarcely the length of the germ, adscendent; inner petals biparted, the lower segment setaceous. Hab. On the margins of ponds near Savannah in Georgia and in Carolina; subaquatic. Obs. Root perennial, fibrous, creeping, base of the stem also radicant; fibres lanuginous. Stem leafy, about 12 inches high. Leaves oblong-lanceolate, approximate, in the spike diminishing to bractes, which are about equal with the flowers. Spike linear, 3 to 5 inches long. Flowers yellowish-green, numerous, but not dense.

H. repens Outer segments of the calix glandularly mucronulate, upper segments vaulted; the 2 inner petals bifid nearly to the base, with the divisions so unequal and divaricate as to appear unconnected, the upper one linear and acute, the lower setaceous; lip 3-parted, the central portion shorter and linear, the 2 lateral setaceous." Nutt. *loc. cit.*

NORTH CAROLINA

1884, *McCarthy* (2).—Near Wilmington, October, 1867, *Wm. M. Canby* (4, 16).

SOUTH CAROLINA

Met Curtis (4).

Aiken Co.: Aiken, August, 1869, *H. W. Ravenell* (2).

Berkeley Co.: Santee Canal, July, *Ravenell* (3).—St. Stephens, *Dr. Macbride* (13).

Beaufort Co.: Bluffton, 1882, *Dr. Mellichamp* (4); 1873, *Mellichamp* (16); 1881, *Mellichamp* (3).—Beaufort district, 1882, *Mellichamp* (5).

GEORGIA, Chatham County

Swamps near Savannah, August 17, 1900 (Biltmore no. 4032 a) (5).

McIntosh Co: Fresh marshes of Altamaha River just below Darien, September 17, 1903, *R. M. Harper* (no. 2002) (1).

Lowndes Co.: Floating with *Piaropus crassipes* in pool, about two miles north of Valdosta, September 1, 1902, *Harper* (no. 1590) (2, 4).

FLORIDA, Volusia County

Wet ground, Beresford, July 11, 1900, *A. H. Curtiss* (no. 6683) (2, 3, 4, 5, 7).

Lake Co.: Eustis, *Prof. Marsh*, Hb. Chapman (5); June and July, 1894, *A. S. Hitchcock* (4); April 1–15, 1894, *Geo. V. Nash* (no. 311) (5, 14); swamps, in water, May 1–15, 1894, *Nash* (no. 578) (3, 4, 10); swampy ground, June 1–15, *Nash* (no. 873) (2, 3, 4, 10).

Sumter Co.: Ditches and swamps, August, 1877, *Curtiss* (no. 2772) (2, 4, 7, 16).

Citrus Co.: June–July, 1898, *A. S. Hitchcock* (4).

Orange Co.: Low pine woods, Oviedo, May 31, 1904, *A. A. Eaton* (no. 1025) (1).

Brevard Co.: Rich woods, near Georgiana Landing, February, 1889, *Wm. M. Canby* (?) (16).

Polk Co.: In water, on floating bog, May 12, 1894, *L. B. Ohlinger* (no. 682) (4).

Manatee Co.: Manatee, December, 1877, *A. P. Garber* (2, 3, 7, 16). —Swampy head, Oneco, June 4, 1904, *Eaton* (no. 1075) (1).

Lee Co.: Fort Myers, June 5, 1904, *Eaton* (no. 1083) (1).—Naples, March, 1904, *O. Ames* (1).

Dade Co.: Wet sand by railroad, Fort Lauderdale, November 19, 1903, *Eaton* (1).

ALABAMA, Baldwin County

Borders of ponds and ditches in the shade, Point Clear, September, 1884 (4).

Mobile Co.: Boggy borders of ponds and ditches, Mobile, October, *Chas. Mohr* (12).

LOUISIANA

Ex Hb. Thurber (3). —*Josiah Hale*, ex Hb. Thurber (3).

CUBA

1836, *Ramon de la Sagra* (21), (type of *H. tricuspis*).—1860–4, *C. Wright* (no. 3305) (3, 4).—Pinales la Catalina, September 11 (1860–4), *Wright* (no. 3307) (3). —Floating islands in Lagunas San Mateo, near Pinar del Rio, December 8 (1860–4), *Wright* (no. 3309) (3, 4).

PORTO RICO

In wet sand, Manati to Vega Baja, June 14–July 22, 1901, *L. M. Underwood & R. F. Griggs* (no. 942) (22).

VENEZUELA

Sacupana, April, 1896, *H. H. Rusby & Roy W. Squires* (no. 394) (3, 4).

Reported as follows:

JAMAICA

St. Anne's, *McNab.*

GUATEMALA

Around lake, Duenas, 4950 ft., *Salvin* (no. 183).

NICARAGUA

Greytown, *Tate* (no. 462).

BRITISH GUIANA

Aquatic in trenches, coast region, *Jenman* (no. 4422).— Near Georgetown, *Jenman* (no. 7232).

H. repens BRAZIL, SANTA CATHARINA
At Blumenau, *Ule* (no. 873).

H. Pringlei 41. H. Pringlei *B. L. Robinson*, in Proc. Am. Acad. 26: 184 (1891); *Kränzl.*, Orch. Gen. et Sp. 1: 188 (1897).—H. macroceratitis *Kränzl.*, Orch. Gen. et Sp. 1: 192 (1897) in part, as syn., 1: 887 (1900), not *Willd.*

"HABENARIA PRINGLEI. Roots mostly fibrous, but the central one tuberous: stem 3 feet high: leaves sheathing, ensiform, carinate, 6–8 inches long, an inch in breadth, gradually tapering to a long point: bracts lanceolate, sharply acuminate, 2 inches long, 5 lines broad; flowers about 10, large, pedicels 18 lines long; the ovary of equal length: sepals ovate, acuminate, minutely cuspidate, 8–9 lines in length; the upper one erect, scarcely at all galeate; lateral petals 2-cleft to the base, the segments linear, acute, the upper broader, not equalling the sepals; the lower very narrow, more than an inch in length: lip 3-cleft nearly to the base, exceeding an inch in length; the segments all narrow and linear, the lateral somewhat surpassing the thickish, scarcely acute central one: fleshy processes very conspicuous, linear-spatulate, 3–4 lines in length: spur over 5 inches long, exceeding the ovary and pedicel, its tip sheathed in the bracts and apparently adherent to them.—Near Guadalajara, June, 1891 (n. 3823). This striking species is related to *H. macroceratitis*, Willd., and *H. setifera*, Lindl., but differs from the former in its much longer narrower leaves, larger flowers, and conspicuous fleshy appendages; from the latter, by its larger more numerous flowers, and in the shape of its petals." Robinson, *loc. cit.*

This is a very distinct species which should not be confused with *H. macroceratitis*. Kränzlin, in *Orchidacearum Genera et Species* 1: 188, recognized it as distinct, but on page 192 referred

H. Pringlei

it to the synonymy of *H. macroceratitis*. This treatment is incomprehensible as the same specimen is cited by Kränzlin under both *H. Pringlei* and H. *macroceratitis*. If number 3828 of Pringle's Mexican collections is a mixture, this fact is not mentioned in Kränzlin's work. As *H. Pringlei* is reduced to synonymy on page 192, it is presumable that Kränzlin reversed his conclusions, indicated on page 188, in subsequent examinations of material (cf. p. 887 *Orch. Gen. et Sp.*). The elongated, ensiform leaves, broad divisions of the petals and labellum, shorter spur, and very characteristic inflorescence are only a few of the salient details which serve to distinguish *H. Pringlei* from *H. macroceratitis*.

MEXICO, San Luis Potosi
Bogs, Las Canoas, August 7, 1891, *C. G. Pringle* (no. 3828) (1, 2, 3, 4, 7).
Vera Cruz: In marsh, Coatzacoalcos, March, 1895, *Charles L. Smith* (no. 1049) (2, 3, 4, 22).
Tabasco: *In paludosis prope urbem Sancti Joannis Baptistæ*, April 5, 1889, *J. M. Rovirosa* (no. 439) (16).

H. bicornis

42. **H. bicornis** *Lindl.*, Gen. & Sp. Orch. 309 (1835); *A. Rich.*, in Sagra Fl. Cub. 2: 249 (1850); *Griseb.*, Cat. Pl. Cub. 270 (1866); *Sauv.*, Fl. Cub. 233 (1873); *Kränzl.*, in Engl. Bot. Jahrb. 16: 61 (1893); *Combs*, in Trans. Acad. Sci. St. Louis 7: 463 (1897); *Kränzl.*, Orch. Gen. et Sp. 1: 187 (1897); *Cogn.*, in Urban Symb. Antill. 6: 301 (1909).—**H. bidentata** *Kränzl.*, Orch. Gen. et Spec. 1: 188 (1897), not *Poeppig* MSS.

"13. Habenaria bicornis.

"H. foliis angusto-lanceolatis acuminatis, racemo denso stricto ferè corymboso, bracteis ovario recto cylindraceo duplò brevioribus, petalis bipartitis a galeâ planâ liberis: laciniâ anteriore subæquali falcatim cornutâ, labelli tripartiti carnosi laciniis spatu-

H. bicornis latis subæqualibus sepalorum longitudine, calcare longissimo inflexo apice compresso.

"Hab. in *Cuba*, Pöppig. (*exam. s. sp. in hb. Hooker.*)

"Caulis 1½ ped. laxè foliosus. Ovarium 1¼ poll. longum. Calcar multò longius. Sep. lat. 4 l. longa, supremo subrotundo obtuso duplò majora. Anthera brevissima, horizontalis, basibus solutis brevissimis ascendentibus. Processus carnosi semioblongi, convexi, paralleli, papillosi." Lindl. *loc. cit.*

CUBA, Santa Clara

Dist. Cienfuegos, Cienguita S. W., August 7, 1895, *Combs* (no. 440) (3, 4); in wet grassland and open woodland, September 3, 1895, *Combs* (no. 755) (3).

Pinar del Rio: Herradura, August 26, 1905, *Van Hermann* (no. 753) (1).

H. macroceratitis **43. H. macroceratitis** *Willd.*, Sp. Pl. 4: 44 (1805); *Reichb. f.*, in Bonpl. 4: 210 (1856); *Griseb.*, Fl. Br. W. Ind. 643 (1864), Cat. Pl. Cub. 270 (1866); *Reichb. f.*, Beitr. Orch. Cent. Am. 102 (1866); *Sauv.*, Fl. Cub. 233 (1873); *Hems.*, Biol. Cent. Am. 3: 305 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 63 (1893); *Cogn.*, in Mart. Fl. Bras. 3, pt. 4, 85 (1893); *Chapm.*, Fl. S. U. S. ed. 3, 488 (1897); *Kränzl.*, Orch. Gen. et Sp. 1: 192 (1897), excl. syn. *H. Pringlei; Small*, in Bull. Torr. Bot. Cl. 27: 275 (1900); *Cogn.*, in Urban Symb. Antill. 6: 299 (1909).

Satyrium erectum, foliis oblongis, petiolis vaginatis amplexantibus, spica terminali, nectariis longissimis, *Browne*, Jam. 324 (1756).

Orchis habenaria *L.*, in Amoen. Acad. 5: 408 (1760), Sp. Pl. ed. 2, 2: 1331 (1763), Syst. Nat. ed. 10, 1242 (1759); *Sw.*, Obs. Bot. 319, t. 9 (1791); *Poir.*, in Lam. Encyc. 4: 595 (1797), excl. Fl. Dan. t. 235; *Sw.*, in Act. Holm. 21: 206 (1800), Fl. Ind. Occ. 3: 1393, 1991 (1806); *Pers.*, Syn. 2: 502 (1807); *Martyn*, in

Mill. Dict. ed. 9, 2: no. 15 (1807), not *O. habenaria* Walt. Fl. Carol. (which is *H. lacera*).

H. macroceratitis

Habenaria macroceras *Spreng.*, Syst. Veg. 3: 692 (1826); *Hook.*, in Curt. Bot. Mag. t. 2947 (1829); *Lindl.*, Gen. & Sp. Orch. 308 (1835); *Paxt.*, Mag. 2: 183 (1836); *Steud.*, Nomencl. ed. 2, 1: 717 (1841); *A. Rich.*, in Sagra Fl. Cub. 2: 249 (1850).

Nemuranthes Habenaria *Raf.*, Fl. Tellur. 2: 62 (1836).

Habenaria Habenaria *Small*, Fl. Se. U. S. 316 (1903).

"98. ORCHIS *habenaria*. *Caulis* pedalis. *Folia* ovato-oblonga, 10 vel ultra, sensim minora. *Bracteæ* ovatæ, acuminatæ, germinibus breviores. *Germina* pollicaria. *Petala* 3 superiora conniventia, subcrenata; lateralia 2 ovato-oblonga, patula. *Labium* tripartitum: intermedia lineari, petalis paulo longiore; lateralibus duplo longioribus. *Cornu* filiforme, dependens, petalis 10-plo longius." L., Amoen. Acad. *loc. cit.*

The specimen in the Linnæan Herbarium is in an excellent state of preservation. Its origin is not indicated by notes of any kind. Walter's *Orchis habenaria* is conspecific with *H. lacera*.

FLORIDA, Sumter County
September 7, 1893, *F. L. Lewton* (4).
Citrus Co.: August, 1898, *J. A. Tait* (2).
Orange Co.: Oviedo, September, 1902, *T. L. Mead* (1).

CUBA
1860–4, *C. Wright* (no. 3308) (3, 4, 21).
Pinar del Rio: Herradura, September 7, 1905, *Van Hermann* (no. 824) (1).

JAMAICA
1858, *Mr. March* (no. 1266) (3).

MEXICO
Pavon (19).
Oaxaca: Mt. Alban, 5500 ft., August 15, 1894, *C. G. Pringle* (no. 5708) (3, 7); dry hills, valley of Oaxaca, alt. 5100–5800 ft., September 8, 1894, *E. W. Nelson* (no. 1246) (3).—El Fortin, 1700 m., September 19, 1897, *C. Conzatti & G. Gonzales* (no. 473) (1, 3).

H. macroceratitis

Jalisco: Road from San Juan Capistrano, August 23, 1897, *J. N. Rose* (no. 2509) (2).

Reported as follows:

JAMAICA
Swartz; Bancroft; March (no. 1266); *Wullschlaegel* (no. 1050).

GUATEMALA
At San Sebastian near Retalhuleu, *Bernouilli & Cairo* (no. 679).

COSTA RICA
Hoffman.

BRITISH GUIANA
Parker, Mt. Cunuca; *Appun* (no. 1448).

SURINAM
Anderson; Berthoud-Coulon (no. 77).

H. macroceratitis var. *brevicalcarata*

H. macroceratitis var. **brevicalcarata** *Ames*, in J. D. Smith Enum. Pl. Guat. pt. 7, 51 (1905), nomen.

This is a peculiar plant which resembles *H. macroceratitis*. The leaves are oblong-lanceolate, acute, 1.5 dm. long, 2.7–3.5 cm. wide. The spurs are about 8 cm. long, slender, gradually thickened toward the tip. The filiform, lateral divisions of the labellum are rolled inwards, or somewhat coiled and twice longer than the intermediate, linear division. My material consists of a single specimen.

GUATEMALA, Sololá
San Lucas Tolimán, alt. 1800 m., February, 1894, *Heyde & Lux*, J. D. Smith distr. (no. 6383) (1).

H. lucæcapensis

44. **H. lucæcapensis** *Fernald*, in Zoe 4: 379 (1893–4).

"A foot and a half high, leafy; principal root tuber-like, an inch long, with numerous accessory fibers from the summit: leaves thin, broadly elliptical, obtusish, four inches long, half as broad, rather abruptly narrowed to a sheathing base; the lowest smaller, orbicular; the upper reduced to lanceolate acuminate bracts, an inch in length; raceme six inches long, 8–10-flowered: upper sepal ovate-elliptic, obtusish, four lines long: petals deeply two-parted, upper segment linear, falcate, obtuse, dilated at the base, ascending, nearly equalling the sepals; lower segment filiform, about an inch in length; labellum three-parted to the base; the outer segments about fifteen lines long; the middle one linear obtuse, a third to a half as long; spur clavate, free, 14–17 lines in length: ovary angled and obsoletely winged, about equalling the bracts; the two appendages of the stigma deeply bifid; the segments linear, spreading laterally, and curved ascending, retuse. Collected on mountains of the Cape Region of Lower California, by T. S. Brandegee, September 16, 1893. *H. lucæcapensis*

"A stout species resembling in habit H. Michauxii, Nutt., of the southern states, but differing in its broader leaves, longer segments of petal and lip, and shorter more clavate spur." Fernald, *loc. cit.*

MEXICO, Lower California
Cape Region mountains, September 16, 1893, *T. S. Brandegee* (3), (type).

45. **H. quinqueseta** (*Michx.*) *Sw.*, Adnot. Bot. 46 (1829); *Eaton & Wr.*, N. A. Bot. ed. 8, 260 (1840); *Mohr*, Pl. Life Ala. 455 (1901); *Small*, Fl. Se. U. S. 315 (1903). *H. quinqueseta*

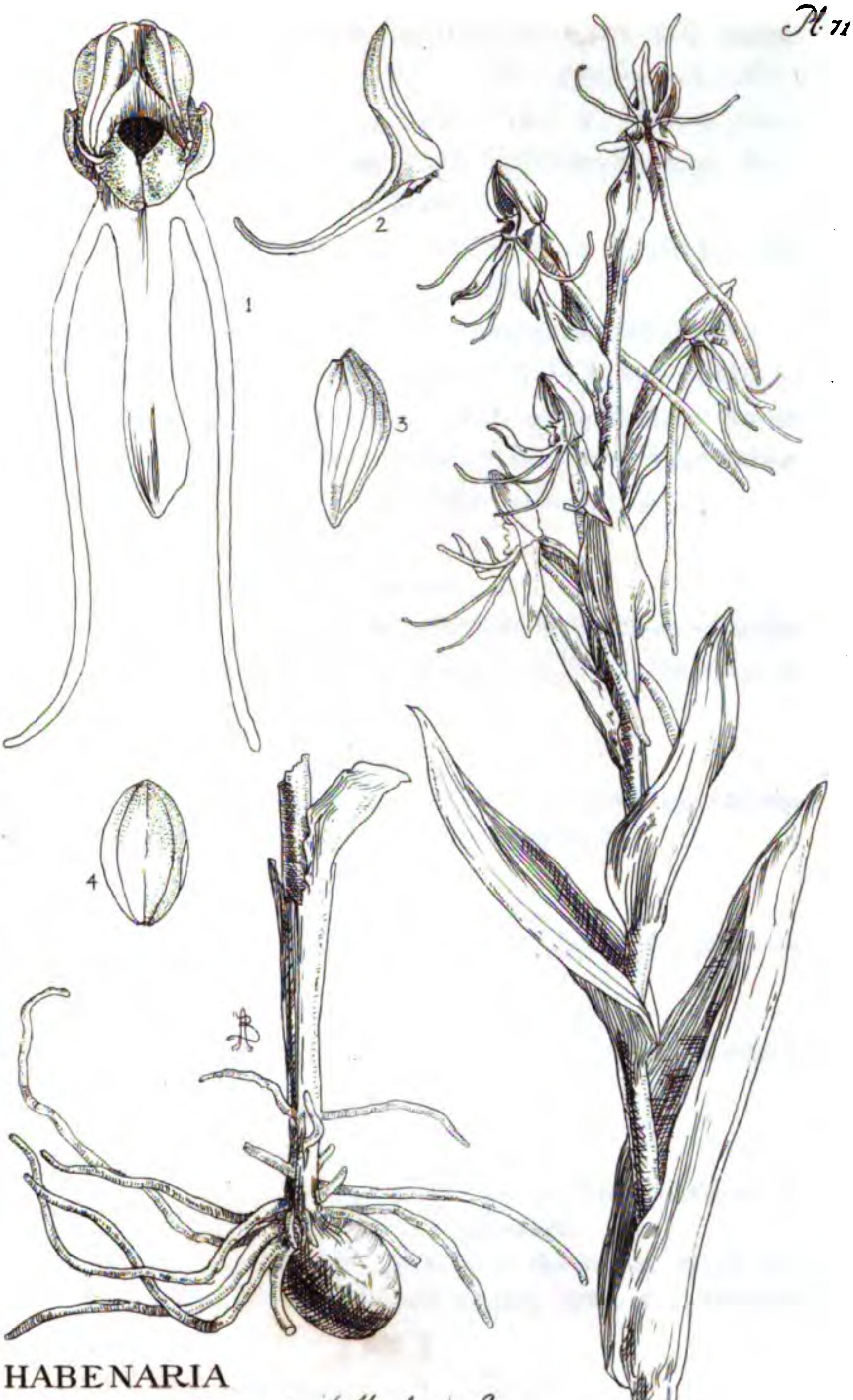
Orchis quinqueseta *Michx.*, Fl. Bor. Am. 2: 155 (1803); *Pers.*, Syn. Pl. 2: 506 (1807); *Pursh*, Fl. 2: 586 (1814); *Raf.*, Neogenyton 4 (1825). Not *O. quinqueseta* Green Cat. N. Y. 120 (1814).

Habenaria Michauxii *Nutt.*, Gen. 2: 189 (1818); *Elliott*, Sketch 2: 489 (1824); *Lindl.*, Gen. & Sp. Orch. 309 (1835); *Steud.*, Nomencl. ed. 2, 1: 717 (1841), excl. syn. *Kunth; Chapm.*, Fl. S. U. S. ed. 1, 461 (1860), ed. 2, 461 (1884), ed. 3, 487 (1897);

PLATE 71. *Habenaria quinqueseta*

Plant, natural size, drawn from a living specimen collected in Florida, by A. A. Eaton. 1. Column and labellum, showing the anthers above and the rounded stigmatic processes below in front of the opening to the spur. 2. Petal. 3. Lateral sepal. 4. Upper sepal. All of the parts drawn, enlarged, with the aid of the camera lucida. (The basal leaves are not shown.)

Pl. 71



HABENARIA
quinqueseta (Michx.) Sw.

H. quinqueseta

Darby, Bot. S. St. 527 (1866); *Kränzl.*, in Engl. Bot. Jahrb. 16: 184 (1893), Orch. Gen. et Sp. 1: 317 (1898), 896 (1901), excl. syn. *H. Garberi*; *Gattinger*, Fl. Tenn. 62 (1901); *Ames*, Orch. Fl. Fla. 8, 11, t. 1 (1904).—**H. latifolia** *Spreng.*, Syst. Veg. 3: 692 (1826) in part, not *Kunth.*

Mesicera quinqueseta *Raf.*, Neogenyton 4 (1825).—**M. Michauxii** *Raf.*, Fl. Tellur. 2: 39 (1836).

Platanthera Michauxii *Wood*, Class-book 685 (1861).

Orchis Michauxii *Wood*, Am. Bot. & Flor. 328 (1871).

"QUINQUESETA. O. foliis ovalibus, acutis: spica floribus distanter alternis; bracteis acuminatis: cornu dupla ovarii longitudine, subbiunciali: labello in quinque lacinias setaceas partito.

"*Obs.* Affinis *O. habenariæ.*

"*Hab.* in Carolina." Michx. *loc. cit.*

The type of *H. quinqueseta* is preserved in Michaux's Herbarium in the Muséum d'Histoire Naturelle de Paris. No notes regarding its habitat are given.

SOUTH CAROLINA, Beaufort County

In sandy soil, Bluffton, September, 1872, *Dr. J. H. Mellichamp* (4); September, 1880, *Mellichamp* (16); 1883, *Mellichamp* (3, 5).

FLORIDA

1889, *J. H. Simpson* (10); *A. W. Chapman* (3).

Walton Co.: Wet pine lands, Crest View, August 21, 1899 (no. 4032) (5).

Calhoun Co.: Very rare, Wewahitchka, *Chapman* (4).

Suwannee Co.: Grassy pine lands, Liveoak, September, 1900 (no. 4032 b) (5).

Lake Co.: Eustis, Hb. Chapman (5).

Hillsboro Co.: 1886, *A. H. Curtiss* (3).

Manatee Co.: Rich dry hammock woods east of Manatee, August 23, 1890, *Simpson* (no. 125) (2), (type of *H. Simpsonii*).

Lee Co.: Caloosa River, August, 1878, *A. P. Garber* (no. 37) (2, 3, 4, 7, 16).—Flat woods, Myers, July and August, 1900, *A. S. Hitchcock* (no. 341) (4).

H. quinque-seta

Dade Co.: Crevices of lime-rock, pine woods south of Cutler, November 11–13, 1903, *A. A. Eaton* (1).—Dry sandy soil, in sun, back of Miami, November 21, 1903, *Eaton* (1).

ALABAMA, Tuscaloosa County

Plank road, twenty miles from Tuscaloosa, August 2, 1878, *E. A. Smith* (12).

TEXAS

Wright (3).

H. oreophila

46. H. oreophila *Greenm.*, in Proc. Am. Acad. 39: 76 (1903).

"Habenaria oreophila. Glabrous throughout: stem erect, leafy, 7 to 8 dm. high: leaves oblong-lanceolate, 1 to 1.5 dm. long, 3 to 3.5 cm. broad, apiculate-acute, entire, membranous; the lowermost leaves reduced to mere sheaths, the uppermost gradually smaller: inflorescence a terminal elongated loose 2 to 3 dm. long raceme; bracts subfoliaceous, lanceolate-acuminate, about equalling the ovary: upper sepal ovate, cucullate, 8 mm. long, 3-nerved; lateral sepals oblong-lanceolate, slightly oblique, obtuse, 3-nerved: lateral petals deeply 2-parted; the upper division lanceolate, upwardly arched, shorter than and coherent with the upper sepal; lower division bent downward, linear-attenuate and somewhat coiled at the tip: labellum deeply 3-parted; the middle lobe ligulate, slightly thickened, 11 to 13 mm. long, obtuse; lateral divisions linear-attenuate, 2.5 cm. long, more or less spirally coiled at the free ends: spur clavate, free, 4 to 4.5 cm. long: column bearing fleshy oblong appendages at the base: ovary narrowly winged.—Mexico. State of Guerrero: mountains near Iguala, 15 September, 1900, *C. G. Pringle*, no. 9248 (hb. Gr.).

"The affinity of this species is with *Habenaria jaliscana*, Watson, and *H. lucæcapensis*, Fernald. From the former it is readily distinguished by the height, the longer leaves, the longer spur, and by the entire absence of the falcate character of the lateral divisions of the labellum; and from the latter it differs in having much longer and narrower leaves." Greenman, *loc. cit.* *H. oreophila*

MEXICO, GUERRERO

Mountains near Iguala, September 15, 1900, *C. G. Pringle* (no. 9248) (3).

47. **H. monorrhiza** (*Sw.*) R. Br., Prodr. 312 (1810); *Reichb. f.*, in Ber. Deut. Bot. Gesell. 3: 274 (1885); *Kuntze*, Rev. Gen. Pl. pt. 2, 664 (1891); *Kränzl.*, in Engl. Bot. Jahrb. 16: 188 (1893) as to syn. and distr. in part, Orch. Gen. et Sp. 1: 390 (1898), excl. descr., syn. in part, and distr. in part; *Urban*, in Symb. Antill. 4: 168 (1903). *H. monorrhiza*

Satyrium erectum simplex, foliis sessilibus ab altero latere recurrentibus, spica terminali, nectariis longissimis *Browne*, Jam. 324 (1756).[1]

Orchis setacea *Jacq.*, Enum. Pl. Carib. 28 (1760), Sel. Stirp. Am. 220 (1763), nomen prior; not *Habenaria setacea* Lindl.—**O. monorrhiza** *Sw.*, Prodr. 118 (1788) in part; *Poir.*, in Lam. Encyc. 4: 601 (1797); *Sw.*, in Act. Holm. 21: 206 (1800), Gen. et Sp. Orch. (Schrader's Neues Journ. 1) 8 (1805); in Fl. Ind. Occ. 3: 1891, 1991 (1806); *Pers.*, Syn. 2: 503 (1807).

Habenaria brachyceratitis *Willd.*, Sp. Pl. 4: 44 (1805); *Kuntze*, Rev. Gen. Pl. pt. 2, 664 (1891). Not *H. brachyceratitis* Lindl. (which is *H. alata* Hook.).—**H. brachyceras** *Spreng.*, Syst. Veg. 3: 692 (1826); *Steud.*, Nomencl. ed. 2, 1: 716 (1841). Not *H. brachyceras* Lindl.—**H. speciosa** *Poepp. & Endl.*, Nov. Gen. ac Sp. 1: 44, t. 76 (1835).—**H. maculosa** *Lindl.*, Gen. & Sp. Orch. 309 (1835), in Benth. Pl. Hartw. 155 (1845); *Reichb. f.*, in Bonpl. 2: 10 (1854), 4: 210 (1856); *Griseb.*, Veg. Karaib. 1818 (1857), Fl. Br. W. Ind. 643 (1864), Cat. Pl. Cub. 270

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[1] The description of the spur suggests *H. macroceratitis*.

H. monorrhiza

(1866); *Sauv.*, Fl. Cub. 288 (1873); *Linden*, in Ill. Hort. 29: 52 (1882); *Kränzl.*, in Engl. Bot. Jahrb. 16: 129 (1893); *Cogn.*, in Mart. Fl. Bras. 3, pt. 4, 88 (1893); *Kuntze*, Rev. Gen. Pl. pt. 3, 299 (1893); *Hitchcock*, Fl. Baham. in Mo. Bot. Gard. Rep. 4: 133 (1893); *Schltr.*, in Bull. Herb. Boiss. 7: 539 (1899); *Kränzl.*, Orch. Gen. et Sp. 1: 309 (1898); *Urban*, in Symb. Antill. 4: 163 (1903); *Ames*, in Smith Enum. Pl. Guat. pt. 7, 51 (1905); *Cogn.*, in Urban Symb. Antill. 6: 304 (1909).

"O. bulbo solitari indiviso, nectarii labio 3-partito: lateralibus setaceis, cornu lineari compresso germinis longitudine.

"Orchis setacea? *Jacq. am. 220.*

"Satyrium. I. *Brown. jam. 324.*

"*Jamaica, Hispaniola.* ♃." Sw. *loc. cit.*

I have been unable to discover the type material of *Habenaria monorrhiza.* In the British Museum, where many of Swartz's specimens are preserved, I found nothing to throw light upon it. Lindley regarded *H. maculosa* distinct from *H. monorrhiza*, but, in my estimation, on insufficient evidence. Several authors have regarded *H. monorrhiza* Br. and *H. alata* Hook. conspecific. Reichenbach, however, indentified as *H. monorrhiza* specimens collected in Porto Rico by Sintenis, which are identical with *H. maculosa.* He also referred *H. maculosa* to the synonymy of *H. monorrhiza,* thereby upholding the views which are entertained in the present volume. Lindley laid stress on the fact that Swartz described a flower which was characterized by simple, undivided petals, but the extreme delicacy of the anterior segment of the petals of *H. monorrhiza,* which renders them easily breakable, he failed to take into account. Furthermore Swartz described the labellum of his flowers as three-parted with the lateral division setaceous, a characterization hardly applicable to *H. alata.* There is no Jamaican Habenaria of which

H. monorrhiza

I have any knowledge that is characterized by a three-parted labellum and simple petals; therefore, unless it is assumed that Swartz overlooked the filamentous anterior division of the petals in the specimen he described as *Orchis monorrhiza,* there is no species known to us which fits his description.

In a recent publication on Jamaican orchids Fawcett & Rendle compare *H. socialis* with *H. alata* Hook., and apparently sustain the views held by Reichenbach. Cogniaux, on the other hand, in Urban's *Symbolæ Antillanæ,* gives *H. alata* Hook. as a synonym of *H. monorrhiza* Br., and refers to *H. maculosa* the species which is here identified with *H. monorrhiza.* Unfortunately Cogniaux does not discuss the matter and in his citation of specimens makes no allusion to Swartz's type.

GUATEMALA, ALTA VERAPAZ

Bl. weiss, Cubilquitz, 350 m., January, 1902, *H. von Türckheim,* J. D. Smith distr. (no. 8299) (1).—Cobán, 1300 m., November, 1902, *Türckheim.* Smith distr. (no. 8459) (1).

CUBA

Wright (no. 3308) (19).—*In Cuba Orientali,* 1856–7, *C. Wright* (no. 625) (3), 1860, *Wright* (no. 625) (4).—*Prope monte verde,* January–July, 1859, *Wright* (no. 625) (3).

SANTIAGO DE CUBA: Slopes of El Yunque near Baracoa, 1000–2000 ft., January 30–31, 1902, *C. L. Pollard & W. Palmer* (2, 3).

PORTO RICO

Maricao in declivibus, November, 1884, *Sintenis* (no. 511) (3, 16), det. *Reichb. f.*—*Prope Adjuntas in Monte Cedro, locis graminosis,* March 25, 1886, *Sintenis* (no. 3995) (2, 3), det. as *H. eustachya* by *Cogniaux.*—*Prope Garcs,* January, 1887, *Sintenis* (no. 5838 b) (2, 3), det. as *H. maculosa* by *Urban.*—Beatriz de Cognas, November 16, 1899, *Goll, Cook & Collins* (2).—Inebrada Ariba, Guayama road, November 17, 1899, *Goll, Cook & Collins* (no. 495) (2).—Bayamon, alt. 75 ft., January 11, 1899, *Mr. and Mrs. A. A. Heller* (no. 89) (2).—On the Adjuntas road, eight miles from Ponce, November 27, 1902, *A. A. Heller* (no. 6133) (3).—

H. monorrhiza Hillsides between Ponce and Utuado, March 12, 1906, *John F. Cowell* (no. 762).

JAMAICA

Mr. March (no. 1273) (3).—Port Antonio, December 23, 1890, *A. S. Hitchcock* (4).—Two miles west of Port Antonio, February 2, 1906, *A. E. Wight* (1).—Blue Mt. Peak, December 13, 1890, *Hitchcock* (4).

ST. THOMAS

Siqualbjagos (?) (1400 ft.), Grosmark, February, 1877, *Eggers* (3); 1880, *Eggers* (no. 253) (3, 16).

GRENADA

1905, *R. Cameron* (1).—St. Andrew's Parish, January, 1906, *W. E. Broadway* (1).

TRINIDAD

Ex Hb. Bernhardi, *Sieber* (no. 202) (4).—In clayey soil among grass in partial shade, St. Francis Valley Road, Belmont, December 22, 1906, *W. E. Broadway* (1).

VENEZUELA

Prope coloniam Tovar, Caracas, 1856–7, *Fendler* (no. 1419) (3).

PERU

In pratis Paccha, *Hartweg* (no. 842) (19).

Reported as follows:

JAMAICA

Swartz (type); *Wullschlaegel* (nos. 1017 & 1049); *Wilson* (no. 160).—At Dover Castle, 700 m., *Eggers* (no. 3775).

PORTO RICO

Stahl (no. 285).

DOMINICA

Imray (no. 304).—*In pratis ad Rosehill*, *Eggers* (no. 932).

ST. VINCENT

Guilding; Anderson.

GUADELOUPE

In pratis humidis, *Duchassaing*.

MARTINIQUE

In woods, *Hahn* (no. 89).

H. monorrhiza

ST. LUCIA

Crudy.

TRINIDAD

Fendler (no. 753).—*Maraval; Crueger* (no. 238).

VENEZUELA

Wagener.—Merida, *Engel.*

COLOMBIA

Linden (no. 706), fide Ill. Hort. 29: 52.—Rio Sucre, 2300 m., *Lehmann.*

ECUADOR

In arena fluvii pastusa prope Baños, Spruce (no. 5219).

PERU

Prope Tarapota, Spruce (no. 4159).—*Cassapi; Mathews* (no. 1884).—Chachapoyas, *Mathews* (no. 3195).—*Poeppig.*

BRAZIL

Pohl.—At Owayas, *Gardner* (no. 3989).

H. crassicornis

48. **H. crassicornis** *Lindl.*, Gen. & Sp. Orch. 311 (1835); *Reichb. f.*, in Linnæa 18: 407 (1844); *Hems.*, Biol. Cent. Am. 3: 305 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 132 (1893), Orch. Gen. et Sp. 1: 314 (1898).—**H. adenantha** *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 28 (1845).

"22. HABENARIA crassicornis.

"H. foliis ovato-oblongis acuminatis, racemo multifloro, bracteis foliaceis acuminatis ovarii longitudine, petalis bipartitis: laciniis lateralibus setaceis ascendentibus, labelli tripartiti laciniis linearibus acutis intermediâ paulò breviore, sepalis lateralibus explanatis acutissimis, calcare recurvo compresso valdè clavato.

"Hab. in *Mexico, de Karwinski.* (*exam. s. sp. in hb. Reg. Monac.*)

"Vix pedalis. Folia sensim in bracteis decrescentia. Flores mediocres. Sepalum supr. cum pet. galeatum. Processus carnosi magni convexi glabri." Lindl. *loc. cit.*

H. crassicornis

"97. *H. adenantha* Nob. Subglandulosa: foliis elliptico-lanceolatis; flor. viridibus glandulosis, sepalis internis lanceolatis, appendice lineari angustissimo: labelli lobis linearibus glandulosis; calcare inflato ovarii longitudine." Rich. & Gal. *loc. cit.*

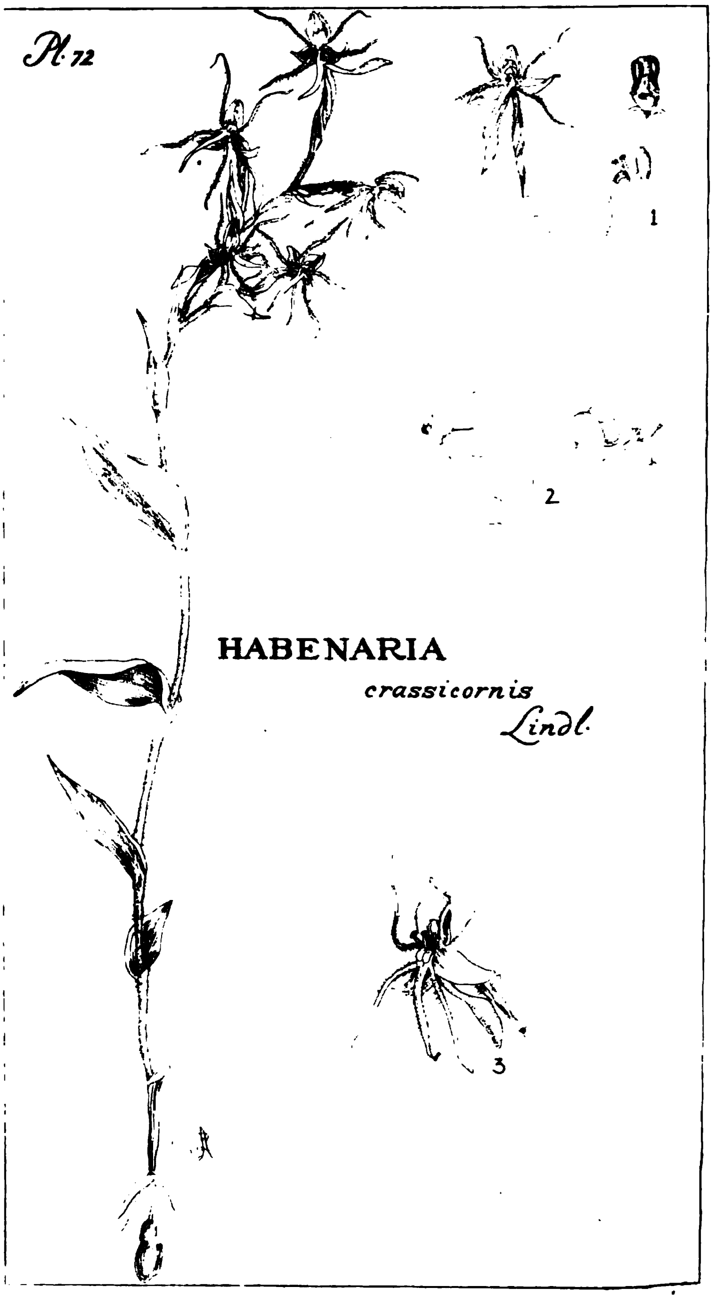
Galeotti's type (no. 5051) is represented at Paris by a single individual, a drawing by Richard of a plant, "no. 88, Juguila à 6500 ft.," and a drawing of a flower and details. The plant is a very characteristic one of *H. crassicornis*, the thick semi-oblong apex of the spur ascending from a very slender basal portion, giving the whole flower the appearance of an ichneumon fly, the setaceous divisions of the perianth bearing a striking resemblance to the legs, the lateral sepals to the wings, the dorsal sepal to the thorax and head, and the spur to the abdomen. (A. A. E.)

H. crassicornis is very clearly distinguished from nearly related species by the minutely glandulose or denticulate petals and lip. The ovary is also glandulose along the angles or wings. In the drawing at Paris this denticulate character is clearly exhibited, although in the original diagnosis of *H. crassicornis* no reference to it is made by Lindley.

In all the specimens of *H. crassicornis* I have examined this denticulate or glandulose character is evident, but I did not look for it in Lindley's specimen,—at least I made no note relating to it. Lindley's sketch which accompanies the type exhibits a perfectly smooth flower, as figure 2, plate 72 shows. In all other respects this sketch suggests the flowers of *H. adenantha* Rich. & Gal. Dr. Prain, in a communication received December 17, 1909, assures me "that the flowers of *Habenaria crassicornis* are, in Lindley's original specimen, covered with little rough points." This observation disposes of uncertainty.

Dr. Kränzlin disregards *H. adenantha* in *Orchidacearum Genera et Species*, and in his account of *H. crassicornis* makes

Pl. 72



HABENARIA
crassicornis
Lindl.

PLATE 72. *Habenaria crassicornis*

Plant, etched from a photograph of the drawing by Richard preserved in the Muséum d'Histoire Naturelle de Paris (type of *H. adenantha* Rich. & Gal.). 1. Copies from a photograph of Richard's drawing of a flower, column and labellum. 2. Flower, according to a sketch in Lindley's herbarium. 3. Flower, from the Brandegee specimen collected in Lower California.

H. crassicornis

no mention of the glandulose protuberances on the labellum and petals.

MEXICO

Fl. viridi, Mineral del Monte, Mexico, *Schiede,* Hb. Lindl. (20).

Lower California: Cape Region, October, 1893, *T. S. Brandegee* (3); September, 1899, *Brandegee* (1).

Jalisco: Cool soil under pines and oaks, hills near Guadalajara, September 1, 1893, *Pringle* (no. 4511) (2, 3, 4, 7).

Morelos: Near El Parque, September 21, 1903, *J. N. Rose & Jos. H. Painter* (no. 7272) (2).

Oaxaca: *Fl. blanc verdâtre, bois près la côte du sud,* 6500 ft., Cordillera, September, 1840, *H. Galeotti* (no. 5051) (21), (type of *H. adenantha* Rich. & Gal.).—Cerro de San Felipe, 2500 m., September 12, 1897, *Conzatti & Gonzales* (no. 457) (3).

Reported as follows:

MEXICO

In Hb. Schlechtendahl, *Leibold* (no. 5).

H. Schaffneri

49. **H. Schaffneri** *Wats.*, in Proc. Am. Acad. 23: 283 (1888); *Kränzl.*, in Engl. Bot. Jahrb. 16: 135 (1893), Orch. Gen. et Sp. 1: 318 (1898).

"Habenaria Schaffneri. Stem stout, 8 inches high, covered with imbricated ovate or ovate-lanceolate sheathing, acute or acuminate leaves 1 to 1½ inches long: bracts large, foliaceous, much exceeding the ovary; raceme short, few- (6–8-) flowered: flowers large, 5 or 6 lines long; lower sepals lanceolate, acutish, the upper broadly elliptical, obtuse, carinate; petals 2-parted, the lower segments very narrow, the upper oblong-falcate, contiguous or subcoherent to the sepal; lip 3-lobed above the base, 5 lines long, the middle lobe narrowly ligulate, the lateral narrowly linear; spur an inch long or more, dilated toward the end and very acuminate: oblong processes of the stigma and beaks of the anther 1½ lines long.—In the

H. Schaffneri

San Miguelito Mountains (5088 Schaffner, 1876) and near San Luis Potosi (860 Parry and Palmer, 1878); under pines in the Sierra Madre, Chihuahua (1875a Pringle, Sept., 1887)." Wats. *loc. cit.*

The type specimen of *H. Schaffneri* in the Gray Herbarium is in an excellent state of preservation. In general habit it has the appearance of a robust form of *H. clypeata. Lateral sepals* about 1 cm. long. *Upper sepal* 1 cm. long, galeate, about 6 mm. wide. *Petals:* posterior division 1 cm. long; anterior division slightly longer, slender, erect. *Labellum* three-lobed, lateral lobes subfiliform, arising about 5 mm. from the opening to the spur, about 11 mm. long, middle lobe fleshy, linear-oblong, about 7 mm. long from the point of origin of the lateral lobes to the tip. The *spur* resembles that of *H. crassicornis.*

MEXICO, CHIHUAHUA

Cool, damp soil under pines, Sierra Madre, September 16, 1887, *Pringle* (no. 1875a) (2, 3, 7, 16), all past anthesis; September, 1888, *Pringle* (no. 1678) (4).

SAN LUIS POTOSI: *In montibus San Miguelito*, 1876, *Dr. J. G. Schaffner* (3, 16) (type).—Region of San Luis Potosi, 6000–8000 ft. alt., 1878, *Parry & Palmer* (no. 860) (2, 3, 16), past anthesis.

H. lactiflora

50. **H. lactiflora** *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 28 (1845); *Hems.*, Biol. Cent. Am. 3: 305 (1884), excl. spec.; *Tonduz*, in Bull. Herb. Boiss. 3: 10 (1895). Not *H. lactiflora* Kränzl., in Engl. Bot. Jahrb. 16: 124 (1893), nor Orch. Gen. et Sp. 1: 296 (1898), as to reference to Reichb. f.—**H. clypeata** *Reichb. f.*, in Linnæa 28: 381 (1856) as syn.

"98. *H. lactiflora* Nob. tab. 39.[1] Foliis ellipticis acutis; flor. albis, sepalo superiori dorso cristato, sepalis internis lanceolatis:

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[1] These tables were never published. The drawings are inserted with the specimens at the Paris Museum. (A. A. E.)

H. lactiflora labelli lobis lateralibus versus mediam partem enatis linearibus, intermedio ovali, oblongo, obtuso." Rich. & Gal. *loc. cit.*

No type of *H. lactiflora* is designated, and it is clear that Richard referred specimens of *H. diffusa* and *H. clypeata* to it, as may be seen by specimens at Paris. (Richard's drawing is of *H. clypeata*?) Certainly Galeotti no. 5218 is not the type, as it has a question mark after it; yet its aspect is more like what must be held as *H. lactiflora.* There is a drawing in the Lindley Herbarium that shows a flower very much like Heyde & Lux no. 3858 (which I refer to var. *buccalis* Reichb. f.). This species may be distinguished readily from *H. clypeata,* which it closely resembles, by the lateral arms arising from near the middle of the lip and the oblong mid-lobe. Lindley's drawing shows these characters perfectly. (A. A. E.)

MEXICO, San Luis Potosi
Hills, Las Canoas, 3500 ft., August 21, 1891, *Pringle* (no. 5027) (3, 7).
Oaxaca: *Fl. blanches en août, bois de chênes à 2000,* November–April, 1840, *Galeotti* (no. 5151) (21), (type?).

H. lactiflora var. *buccalis* **H. lactiflora** var. **buccalis** *Reichb. f.*, in Beitr. Orch. Cent. Am. 61 (1866); *Hems.*, Biol. Cent. Am. 3: 305 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 124 (1893); *Tonduz*, in Bull. Herb. Boiss. 3: 10 (1895).

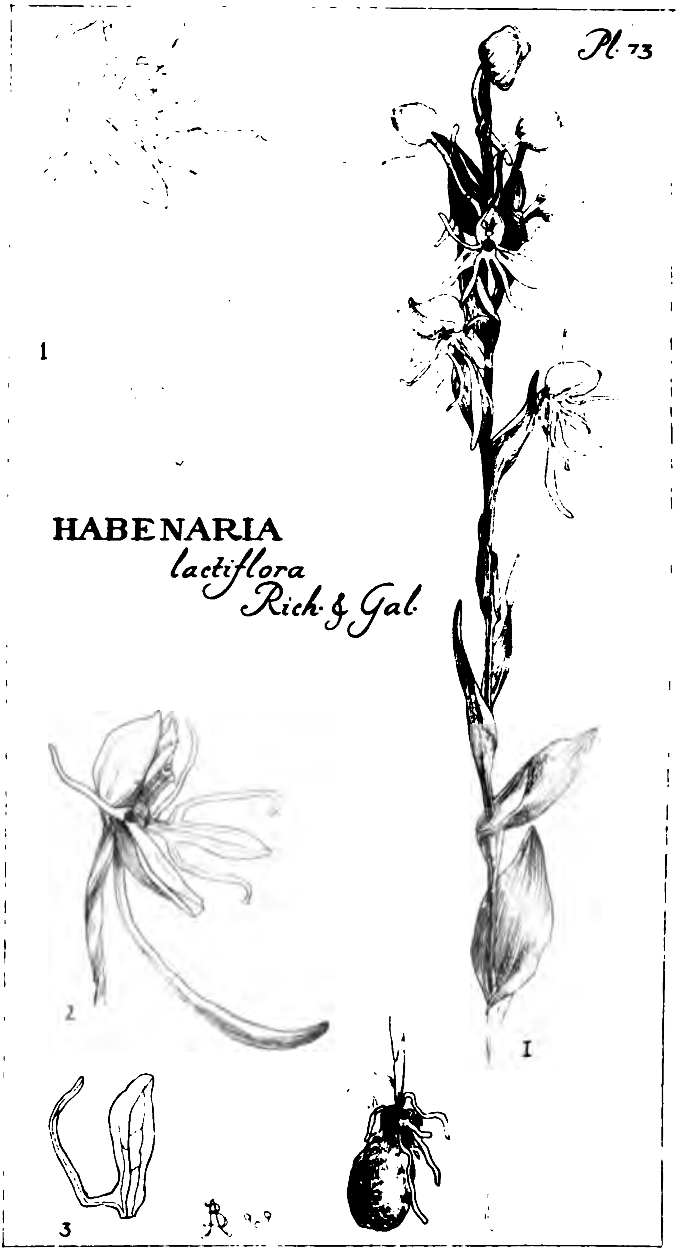
"1. Habenaria lactiflora A. Rich. & Gal. Ann. Sc. nat. 1845, pag. 28, No. 98 var. buccalis: stigmatis cruribus majusculis, optime retusis.

"'Blüthen hellgrün. Lippe weiss.'

"Aladhuela-Desengaño. 4. 8. 57." Reichb. f. *loc. cit.*

The status of *H. lactiflora* Rich. & Gal. in this monograph is based on Eaton's notes made at Paris in November, 1905. In order to make these notes as clear as possible the accompanying plate has been prepared to represent the drawing by Richard,

Pl. 73



HABENARIA
lactiflora
Rich. & Gal.

PLATE 73. *Habenaria lactiflora*

I. Plant, etched from a photograph of Richard's drawing preserved in the Muséum d'Histoire Naturelle de Paris. 1. Flower, copied from a tracing of a flower in Lindley's herbarium. 2. Flower, enlarged, drawn from the Heyde & Lux specimen in Hb. Ames. 3. Petal.

Figs. 2 and 3 drawn, enlarged, with the aid of the camera lucida.

H. lactiflora var. *buccalis*

the sketch in Lindley's herbarium at Kew, and a flower taken from the plant collected by Heyde & Lux, which Eaton referred to var. *buccalis*.

Great caution should be observed in considering the characters of the labellum. The origin of the lateral arms follows no definite rule, and is more likely to cause confusion, if relied on, than to assist in specific distinction.

In my opinion *H. lactiflora* and *H. clypeata* are very closely allied, and will be found to offer no satisfactory characters on which to establish two distinct species.

The position of the *var. buccalis*, on the other hand, is not clear.

More material than I have seen and a thorough study of types are necessary to establish certainty regarding *H. clypeata* and its allies.

GUATEMALA, Santa Rosa

Cerro Gordo, August, 1892, *Heyde & Lux*, J. D. Smith distr. (no. 3858) (1). I refer this here on account of its green color, prominent stigmas, and its native locality. (A. A. E.)

H. clypeata

51. **H. clypeata** *Lindl.*, Gen. & Sp. Orch. 311 (1835), in Benth. Pl. Hartw. 52, 53 (1840); *Reichb. f.*, in Linnæa 18: 407 (1844), 28: 381 (1856), excl. syn., in Bonpl. 4: 210 (1856); *Hems.*, Biol. Cent. Am. 3: 305 (1884), excl. Galeotti no. 5151; *Kränzl.*, in Engl. Bot. Jahrb. 16: 131 (1893) in part, Orch. Gen. et Sp. 1: 313 (1898) in part; *Schltr.*, in Bull. Herb. Boiss. 7: 539 (1899); *Ames*, in Smith Enum. Pl. Guat. pt. 7, 51 (1905).—**H. lactiflora** *Reichb. f.*, in Linnæa 28: 381 (1856) as syn., not *A. Rich.*—?**H. flexuosa** *Reichb. f.*, loc. cit., as to syn., not *Lindl.*; *Kränzl.*, in Engl. Bot. Jahrb. 16: 131 (1893), Orch. Gen. et Sp. 1: 251 (1897).—**H. guadalajarana** *Kränzl.*, Orch. Gen. et Sp. 1: 313

(1898) in part, not *Wats.*—H. filifera *Kränzl.*, Orch. Gen. et Sp. 1: 818 (1898), in syn., not *Wats.*—H. jaliscana *Kränzl.*, Orch. Gen. et Sp. 1: 818 (1898), in syn., not *Wats.* *H. clypeata*

"24. HABENARIA clypeata.

"H. foliis parvis ovatis cuspidatis sensim decrescentibus, racemo multifloro, bracteis foliaceis cucullatis acuminatis ovario brevioribus, petalis bipartitis: laciniis anterioribus linearibus horizontalibus posticis cum sepalo supremo rotundato galeam orbiculatam planam efficientibus, labelli penduli tripartiti laciniâ intermediâ lineari-lanceolatâ lateralibus linearibus paulò longiore, calcare compresso ovarii longitudine.

"Hab. in *Mexico, de Karwinski. (exam. s. sp. in hb. Reg. Monac.)*

"Caulis pedalis. Racemus oblongus, multiflorus. Galea orbiculata plana facie omninò peculiari hanc speciem induit." Lindl. *loc. cit.*

There is no type specimen of this in Lindley's herbarium, but it is quite probable that sketches of a plant, flower, and petal therein contained were made from Karwinski's material, which should be in the royal herbarium at Monaco. That these sketches were from this source is the more likely as similar sketches represent the other species founded on Karwinski's collection. If this view is correct, these sketches prove that the general conception of *H. clypeata* held by authors is the correct one. It is represented by a mixture of two or three species in the herbaria of Kew, the British Museum, and the Muséum d'Histoire Naturelle de Paris. Perhaps the most closely related species is *H. lactiflora* Rich., which may be distinguished by the lateral divisions of the broader labellum that arise from near its middle and reach beyond the mid-lobe. In *H. clypeata* the lateral lobes arise from near the base of the middle lobe which they scarcely

H. clypeata

equal in length. Dr. Kränzlin refers *H. jaliscana* Wats. and *H. guadalajarana* Wats. to *H. clypeata.* It is highly probable that he would have refrained from doing so had he studied the type specimens of *H. jaliscana* and *H. guadalajarana.* Dr. Kränzlin also refers *H. flexuosa* Lindl. to *H. clypeata.* His reasons for adopting this course are not given in detail.

MEXICO, Chihuahua

In the Sierra Madre near Colonia Garcia, 8000 ft., July 31, 1899, *C. H. Townsend & C. H. Barber* (no. 195) (2, 4).

Lower California: Cape Region Mts., September, 1893, *T. S. Brandegee* (3).

Jalisco: Flowers white, fragrant, mossy, grassy places near Guadalajara, August, 1893, *Pringle* (no. 4510) (2, 3, 4, 7).—Sierra Madre west of Bolaños, September 16, 1897, *J. N. Rose* (nos. 2970, 3712) (2).—Between Dolores and Santa Gertrudis, August 7, 1897, *Rose* (no. 2062) (2).

Michoacán: In pastures, Angangueo, *Hartweg* (19, 20).—*Fl. blanches, Cordillera à Uruapan à 4000*, June–October, 1840, *H. Galeotti* (no. 5219) (21).—Hills near Patzcuaro, July 30, 1892, *Pringle* (no. 5361) (3).

Federal Distr.: Pedrigal, Valley of Mexico, September 1, 1896, *Pringle* (no. 7266) (2, 3, 7).—Cool soil, Eslava, 8000 ft., September 7, 1901, *Pringle* (no. 9858) (2, 3, 4, 7).

Vera Cruz: *Région d'Orizaba, 16 août*, 1866, *Hahn* (no. 2872), Herb. Comm. sci. du Mex. (3, ex Hb. Mus. Par.).

Also reported from GUATEMALA

H. entomantha

52. **H. entomantha** (*La Llave*) *Lindl.*, Gen. & Sp. Orch. 311 (1835); *Reichb. f.*, in Bonpl. 4: 210 (1856); *Hems.*, Biol. Cent. Am. 3: 305 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 116 (1893),[1] Orch. Gen. et Sp. 1: 286 (1898), (excl. sp. cit. ?).

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[1] Kränzlin (in *Engl. Bot. Jahrb.* loc. cit.) cites several specimens from Mexico and Guatemala, but he omits these and substitutes South American specimens in *Orchidacearum Genera et Species.*

A study of the habital sketch and drawing of a flower made by Lindley, probably from Karwinski's plant, and now preserved in Lindley's herbarium at Kew, convinces me that this species is represented by *H. filifera* Wats. rather than by Fendler's no. 1418 from Vene-

Orchis entomantha *La Llave*, Nov. Veg. Descr. 2: Orch. Opusc. 8 (1825). *H. entomantha*

Habenaria acutiflora *A. Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 29 (1845).—**H. filifera** *Wats.*, in Proc. Am. Acad. 26: 154 (1891); *Schltr.*, in Bull. Herb. Boiss. 7: 539 (1899).—**H. clypeata** *Kränzl.*, Orch. Gen. et Sp. 1: 313 (1898) in part, not *Lindl.*

“O. Labello biglanduloso quinque partito; laciniis linearibus revolutis; calcare ovario longiore; foliis vaginantibus ovatis, quinque nerviis.

“Planta terrestris, vix pedalis.—Bulbus solidus, subglobosus indivisus; radiculæ filiformes.—Caulis simplex, angulatus, erectus.—Folia ovata, rugata, alterna, vaginantia, nerviis quinque longitudinalibus.—Spica florum laxa. Flores alterni, bracteis lanceolatis, carinatis involuti.—Perigonium lacteum, concavum, 5 fidum; tribus segmentis superioribus connatis; duobus lateralibus divergentibus acutis.—Labellum quinque-partitum, concolor, laciniis lineari-setaceis revolutis.—Gynostemum, capitatum, conico ovatum, obscure bifidum. Anthera bilocularis supra excavata. Pollinis massulæ duæ obovatæ, pedicellatæ, lutescentes. Stigma cavum, intra duos loculos antheræ hians.—Ovarium triquetrum, nonnihil contortum. Calcar sive Nectarium longissimum, filiforme, tubulatum, intra labellum et gynostemum excavatum duabus glandulis virescentibus versus faucem corniculi prominentibus.—Capsula ut in congeneribus.

“Habitat prope *Vallisoletum;* floretque Julio et Augusto.

“Obs. *Orchidi 5 setæ Michauxii planta parum affinis; characteribus plurimis sane diversa. L.*

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zuela, mounted on the same sheet, and found also in other herbaria, determined by Lindley as *H. entomantha*. The Mexican and Venezuelan plants are of different species, and the name must attach to the Mexican plant. It is possible that *H. maxillaris* Reichb. f. (not Lindl.), *Beiträge zu einer Orchideenkunde Central Amerika's 61*, also belongs here. (A. A. E.)

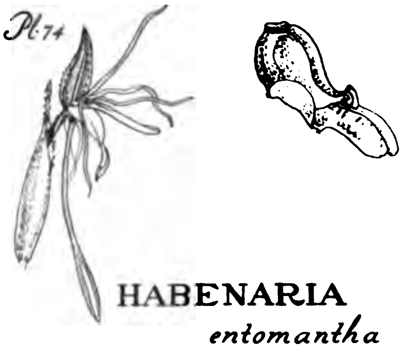
PLATE 74

I. *Habenaria entomantha.* Flower and column etched from a photograph of the drawing by A. Richard of *H. acutiflora* Rich. & Gal.

II. *Habenaria jaliscana.* Flower and column etched from a photograph of the drawing by A. Richard of *H. alata* Rich. & Gal.

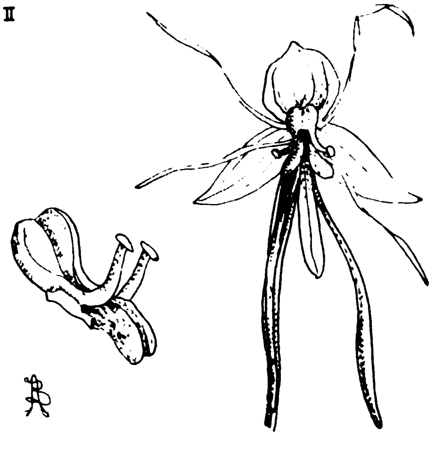
Pl. 74

I



HABENARIA
entomantha
Lindl.

II



HABENARIA
jaliscana Wats.

"a. Orchis entomantha, *floribus herbaceis.—Prope Vallisoletum.*" La Llave, *loc. cit.* (PLATE 74.) *H. entomantha*

MEXICO

Tracing of plant and drawing of flower, probably from Karwinski's specimen, in Herb. Lindl. (20).—*Hartweg* (no. 399) (in hb. 19 as *H. clypeata*). —*Pringle*, without label (4).

CHIHUAHUA: Cool ridges of the Sierra Madre, October, 1887, *Pringle* (no. 1375 b) (3, 4, 7), (type of *H. filifera* Wats.).

JALISCO: Cool soil under pines and oaks, hills near Guadalajara, September 4, 1893, *Pringle* (no. 4509) (3, 7).

MICHOACÁN: Cool, wooded hillsides near Patzcuaro, October 10, 1892, *Pringle* (no. 5223) (1, 5).

?CHIAPAS: *Terre froide, croît dans les forêts de pins. Fleure d'un blanc jaunâtre. Fleurit en juillet*, 1864–70, *Dr. Ghiesbreght* (no. 776) (3).

VERA CRUZ: *Fl. blanches*, Jesus del Monte, 7000 ft., 1840, *Galeotti* (no. 5212) (21).

Also reported from GUATEMALA

53. **H. jaliscana** *Wats.*, in Proc. Am. Acad. 22: 455 (1887).—H. alata *Rich. & Gal.* in Ann. Sci. Nat. ser. 3, 3: 29 (1845), not *Hook.*—H. clypeata *Kränzl.*, Orch. Gen. et Sp. 1: 313 (1898) in part. *H. jaliscana*

"HABENARIA JALISCANA. A foot high from a small tuberous root, stout and leafy: leaves lanceolate, or the lower ovate, acute, sheathing, 3 inches long or less: raceme short and open, with large foliaceous bracts: sepals ovate, acute, nearly equal (4 lines long), the lateral sub-falcate; petals 2-parted and the lip 3-parted, the divisions strongly falcate excepting the ligulate-spatulate obtuse middle lobe of the lip, its longer (6 lines) lateral lobes and the lower lobes of the petals approximate on each side, linear, acuminate, the upper petal-lobes contiguous to the upper sepal; spur narrowly clavate, 12 to 15 lines long: column with

H. jaliscana fleshy oblong appendages at base, 1½ lines long; stigmatic p cesses 1½ lines long. Rio Blanco in moist bottoms; August. (34 —Flowers greenish yellow. This (as the following) may be so one of the species named by Richard & Galeotti, but their descri tions certainly do not apply to the specimens." Wats. *loc. cit.*

H. jaliscana resembles *H. Schaffneri.* In the mature flowe however, the spur is much more slender than in *H. Schaffn* and about 8 cm. long. The anterior divisions of the petals a unusually long, as is shown in the specimen from which Richar prepared his drawing of *H. alata.*

Pringle's no. 4508 as represented by specimens in my herbari agrees in almost every detail with the type of *H. alata* Rich. & Gal., preserved in the herbarium of the Muséum d'Histoire N turelle de Paris. Richard's material is in excellent condition fo comparative studies. The specimens collected by Galeotti a Mirador give the following measurements. *Dorsal sepal* abou 6 mm. long, orbicular-oblong, acute. *Lateral sepals* 11 mm. long 4.5 mm. wide. *Petals:* posterior division 8 mm. long, 1.5 mm wide, falcate-linear; anterior division 18 mm. long. *Middle lob* of the labellum 14 mm. long. *Lateral lobes* basal. (Plate 74.)

MEXICO, Durango

Near El Salto, July 12, 1898, *E. W. Nelson* (no. 4575) (2).[1]

San Luis Potosi: September, 1879, *Schaffner* (no. 508) (20).

Jalisco: In moist bottoms, Rio Blanco, August, 1886, *Dr. Edward Palmer* (no. 342) (2), (no. 343) (3, 16), (type).—Among pines, hills near Guadalajara, 5500 ft., August 23, 1893, *Pringle* (no. 4508) (1, 2, 3, 4, 7).—In the Sierra Madre, west of Bolaños, September 15–17, 1897, *J. N. Ros* (no. 3006) (2).

Vera Cruz: *Linden* (21).—*Fl. blanches,* Cordillera, Mirador, June–October, 1840, *Galeotti* (no. 5264) (21), (type of *H. alata* Rich. & Gal.).

Oaxaca: *Ghiesbreght* (21).

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[1] In Nelson's specimen no. 4575 the lateral divisions of the labellum arise 3 mm. from th base.

54. H. diffusa *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 28 (1845); *H. diffusa Reichb. f.*, in Linnæa 28: 381 (1856); *Hems.*, Biol. Cent. Am. 3: 305 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 132 (1893), Orch. Gen. et Sp. 1: 315 (1898); *Schltr.*, in Bull. Herb. Boiss. 7: 539 (1899).—**H. novemfida** *Lindl.*, in Benth. Pl. Hartw. 94 (1842); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 98 (1893), Orch. Gen. et Sp. 1: 253 (1897).—**H. lactiflora** *Hems.*, Biol. Cent. Am. 3: 305 (1884) as to specimen cited.

"96. *H. diffusa* Nob. Foliis sessilibus elliptico-acutis; flor. viridibus, sepalis internis lanceolatis, appendice lineari ascendente: labelli laciniis lateralibus linearibus, intermedia latiori breviori, calcare ovario longiori." Rich. & Gal. *loc. cit.*

In Lindley's herbarium there is a duplicate of a Galeotti specimen which is identified as *H. diffusa*. Lindley's drawing of a flower resembles very closely Richard's drawing, which was presumably prepared from Galeotti's no. 5150, although it shows longer anterior divisions on the petals. Measurements from Galeotti's no. 5150 are as follows:

Plant 3.4 dm. tall. *Leaves* about 7 cm. long, 1.5–2.5 cm. wide. *Raceme* 9.5 cm. long, rather loosely flowered. *Ovary* 18 mm. long, very slender; *bracts* about half as long (up to ⅔). *Dorsal sepal* 5 mm. long. *Lateral sepals* reflexed, 7 mm. long, 3 mm. wide. *Petals* shorter than the dorsal sepal, the anterior divisions 5–5.5 mm. long and equal to the lateral divisions of the labellum. *Middle lobe* of the *labellum* wider than the lateral lobes. *Spur* about 1.7 cm. long.

H. novemfida Lindl. presents for consideration a remarkable example of inaccuracy of observation. The petals as described by Lindley are 3-parted. In Lindley's herbarium there is a sketch which shows this character and beside which is written "verified Aug., 1854." Dr. Prain kindly examined the original specimen

H. diffusa at my request, and reported that a flower moistened and carefully removed from the type has *bifid petals*, and that Lindley's drawing is clearly erroneous. In the light of this correction *H. novemfida* appears to be closely allied to *H. diffusa*, to which species I believe it should be referred. (Plate 75.)

MEXICO, Lower California

Cape Region Mts., September, 1893, *T. S. Brandegee* (3).

San Luis Potosi: 1875, *J. G. Schaffner* (2).—Tamasopo Cañon, September 30, 1890, *Pringle* (no. 3512) (3).—Hillsides, Los Canoas, August 29, 1891, *Pringle* (no. 5026) (3).

Jalisco: Shaded rocky slopes, near Guadalajara, September 26, 1889, *Pringle* (no. 2964) (3, 7, 16); cool banks near Guadalajara, August 19, 1893, *Pringle* (no. 5390) (1, 5).

Michoacán: Damp rocky hills, Coapa, August 8, 1892, *Pringle* (no. 4189) (2, 3, 19).

Morelos: Near Cuernavaca, September 10, 1903, *J. N. Rose & J. H. Painter* (nos. 6905, 6932) (2).

Vera Cruz: *Fl. vertes, en août, champs et bois à 2000–3000*, 1840, *Galeotti* (no. 5149) (21) (type?); *Galeotti* (no. 5150) (21).—Mirador, June–October, 1840, *Galeotti* (no. 7263) (20); August, 1841, *Liebmann* (nos. 145, 146) (3).—*Région d'Orizaba, août*, 1866, *Bourgeau* (no. 1873) (3, ex Hb. Mus. Par.).

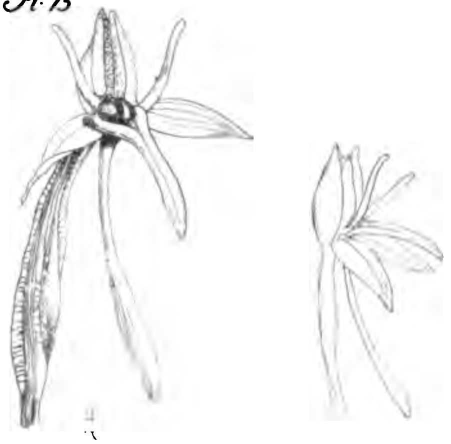
Mexico: Rocky hills near Lecheria, 7500 ft., August 23, 1904, *Pringle* (no. 8926) (1, 3).

Also reported from GUATEMALA

H. flexuosa 55. **H. flexuosa** *Lindl.*, Gen. & Sp. Orch. 311 (1835); *Hems.*, Biol. Cent. Am. 3: 305 (1884). Not *H. flexuosa* Reichb. f., in Flora 48: 180 (1865).—**H. clypeata** var. *Lindl.*, in Benth. Pl. Hartw. 53 (1840).—**H. clypeata** *Reichb. f.*, in Linnæa 28: 381 (1856), not *Lindl.*; *Kränzl.*, in Engl. Bot. Jahrb. 16: 131 (1893), Orch. Gen. et Sp. 1: 313 (1898) in part.—**H. lactiflora** *Hems.*, Biol. Cent. Am. 3: 305 (1884) as to specimens; *Kränzl.*, in Engl.

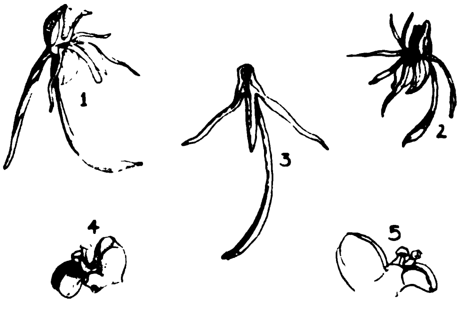
Pl. 75

I



HABENARIA
orizabensis Rich. & Gal.

II



HABENARIA
diffusa Rich. & Gal.

ORCHIDACEÆ

PLATE 75

I. *Habenaria orizabensis.* Flowers, etched from a photograph of the drawing by A. Richard.

II. *Habenaria diffusa.* 1 and 2. Flower. 3. Labellum and spur. 4 and 5. Column. Etched from a photograph of the drawing by A. Richard.

H. flexuosa Bot. Jahrb. 16: 124 (1893), Orch. Gen. et Sp. 1: 297 (1898). Not *H. lactiflora*, Rich. & Gal.

"23. HABENARIA flexuosa.

"H. foliis oblongo-lanceolatis acutis, floribus distantibus, bracteis foliaceis acuminatis cucullatis ovarii longitudine, petalis bipartitis: laciniis anterioribus filiformibus rectis reflexis galea brevioribus, labelli tripartiti laciniis filiformibus æqualibus, sepalis lateralibus pendulis supremo æqualibus, calcare filiformi compresso recto pendulo ovario duplò longiore.

"Hab. in *Mexico*, ad S. Pedro, Oaxaca, *de Karwinski* (*exam. s. sp. in hb. Mart.*)

"Caulis subflexuosus, 9 poll. altus, foliis sensim in bracteis decrescentibus." Lindl. *loc. cit.*

Lindley's herbarium contains a sketch of a plant and a flower, labelled "Mexico," probably from the type, as he was in the habit of sketching types that were loaned him, especially Karwinski's. On the same sheet is a specimen from Orizaba by Botteri, and under *H. clypeata* (so referred by Kränzlin) a specimen collected at "Angangueo, Hartweg." This is labelled "clypeata var.?" by Lindley, and is the *H. clypeata* var. in Bentham's *Plantæ Hartwegianæ* 53 (Hartweg no. 399), as shown by specimens in the British Museum. Although similar to *H. clypeata* it may be known by its looser habit, green flowers, shorter spur, narrower mid-lobe of the lip, which is shorter than the laterals and basal. (A. A. E.)

H. diffusa and *H. flexuosa* are closely related species which are often extremely difficult to distinguish from one another. The leaves of *H. diffusa* are larger than those of *H. flexuosa* and the structure of the flowers offers slight differences, but these characters may prove to be very variable and unreliable for specific distinction.

In a series of specimens referred to *H. flexuosa* the leaves average about 4 cm. in length. *H. flexuosa*

MEXICO, Michoacán

On pastures, Angangueo, August, September, *Hartweg* (no. 399) (19, 20). —Mountains, Patzcuaro, August 2, 1892, *Pringle* (no. 5337) (3, 7).

Hidalgo: Damp soils of hills near Cuyamaloya station, 9000 ft., August 2, 1904, *Pringle* (no. 13,211) (1).—Trinidad, July 16, 1904, *Pringle* (no. 11,919) (1).

Vera Cruz: *Région d'Orizaba,* 16 *août,* 1866, *E. Bourgeau* (no. 2873). (Comm. Sci. du Mex. Det. as *H. lactiflora* by Kränzl.) (20).—*Région d'Orizaba, août,* 1866, *Hahn* (no. 1873). (Comm. Sci. du Mex. Dist. Mus. Par. as *H. lactea* Rich. & Gal.).—Orizaba, August, *Botteri* (no. 234) (20).

Oaxaca: San Pedro, *Karwinski* (20) (type), (drawing in Hb. Lindl.) (20). —Sierra de San Felipe, alt. 6500–7500 ft., August 13, 1894, *Pringle* (no. 5759, as *H. diffusa*) (3, 7); September 12, 1897, *C. Conzatti & V. Gonzales* (no. 457) (1).—Eighteen miles southwest of the City of Oaxaca, alt. 5500–9500 ft., September 10–20, 1894, *E. W. Nelson* (no. 1344) (3). —Cerro de San Felipe, 3000 m., August 15, 1897, *Conzatti & Gonzales* (no. 370) (Hb. Conzatti).

56. **H. felipensis** sp. nov. *Habitu H. subauriculatæ* haud dissimilis. *Planta* 12–27 cm. alta, gracilis, foliosa. *Tubera* ovata, 1.5 cm. longa. *Folia* ovato-lanceolata, acuta, 2–3.5 cm. longa, 7–11 mm. lata, in bracteas transeuntia. *Bracteæ inflorescentiæ* ovariis longiores excedentes flores infimos, 1.5–2 cm. longæ, acuminatæ, acutæ. *Inflorescentia* 3–12.5 cm. longa, laxa. *Flores* virides, 5–20 in racemo spicato dispositi. *Sepala lateralia* oblongo-lanceolata, subacuta, uninervia, 6 mm. longa, 2 mm. lata. *Sepalum dorsale* ovatum, lateralibus multo latius, 5 mm. longum. *Petala* bipartita: lacinia posterior 4 mm. longa, lineari-oblonga; lacinia anterior filiformis, 4 mm. longa. *Labellum* usque ad basim tripartitum; laciniæ laterales media subbreviores; lacinia media *H. felipensis*

H. felipensis 6.5 mm. longa, 1.5 mm. lata, acuta. *Calcar* ± 1 cm. longum, ad apicem inflatum. *Processus stigmatis* prominentis.

Pringle's no. 4806 collected in the state of Oaxaca resembles *H. subauriculata* so closely that it can be separated with certainty from it only by means of the bifid petals and by the lateral divisions of the labellum which are directed forward and not reflexed. Habitally it is almost a counterpart of *H. subauriculata*, and if it were not for several well marked differences in the flowers the two could be distinguished from one another only with extreme difficulty. The nearest affinity of *H. felipensis* is *H. flexuosa*, which is larger in all its parts and taller. Pringle's no. 4806, which constitutes the type, was originally distributed as *H. flexuosa*, and in Kränzlin's *Orchidacearum Genera et Species* is referred to the synonymy of *H. clypeata*, with which it has very little in common. (PLATE 77.)

MEXICO, OAXACA

Sierra de San Felipe, 9000 ft. alt., August, 1894, *C. G. Pringle* (no. 4806) (1, 2, 3).

H. guadalajarana 57. **H. guadalajarana** *Wats.*, in Proc. Am. Acad. 22: 456 (1887).—**H. clypeata** *Kränzl.*, in Engl. Bot. Jahrb. 16: 181 (1893), Orch. Gen. et Sp. 1: 318 (1898) in part, not *Lindl.*

"HABENARIA GUADALAJARANA. Habit of the last;[1] leaves ovate, sheathing, shortly acuminate or acute, 1½ inches long or less: raceme rather slender, 4 inches long, the bracts equalling the ovaries: sepals 2½ or 3 lines long, the upper broadly ovate, acute, sharply carinate, the lateral oblong-lanceolate, acute; middle lobe of the lip narrowly ligulate, slightly shorter than the subfiliform lateral lobes and lower segments of the petals, the upper divisions of the petals narrowly lanceolate, acute, slightly falcate;

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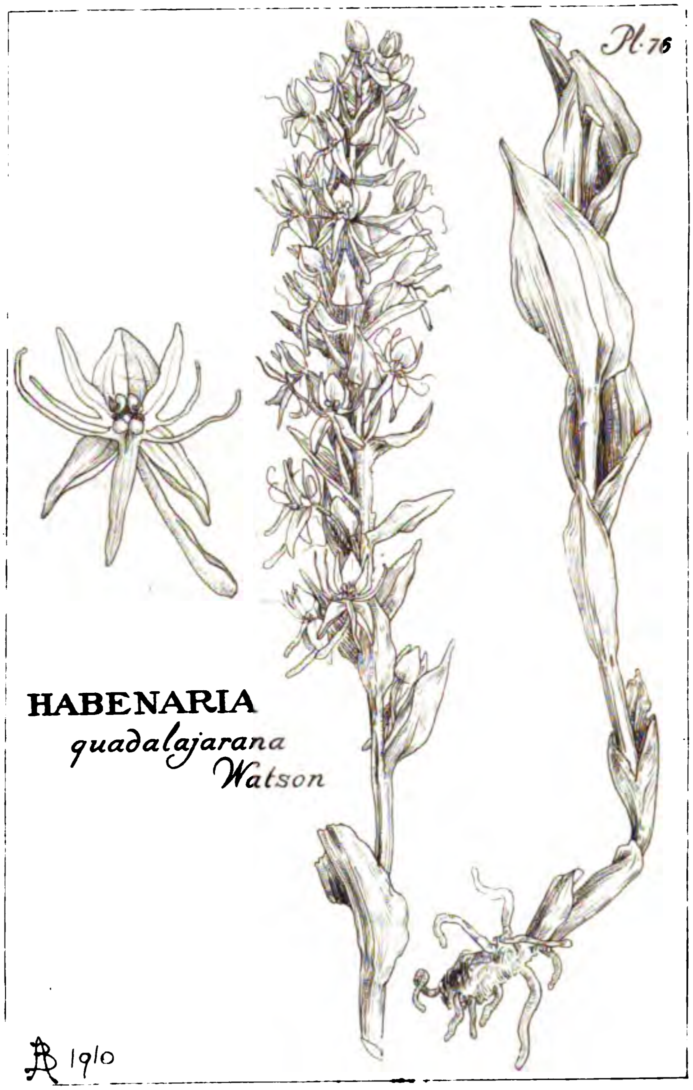
[1] *H. jaliscana.*



Pl. 76

HABENARIA
quadalajarana
Watson

1910

PLATE 76. *Habenaria guadalajarana*
Plant and flower etched from the type specimen in the Gray Herbarium of Harvard University. The flower, enlarged, was drawn with the aid of the camera lucida.

H. guadalajarana spur clavate, equalling the ovary: processes nearly a line long; appendages at the base of the column very thick and verrucose. Guadalajara, in wet bottoms; August. (276.)—Flowers greenish yellow. With this in the Cambridge set is a small specimen with fewer and smaller flowers and narrower acuminate leaves, which belongs to some other species." Wats. *loc. cit.*

All other specimens of Palmer no. 276 which have been examined are of the small species mentioned by Watson, and appear to be related to *H. subauriculata*. Kränzlin reduces both this and *H. jaliscana* to *H. clypeata*, apparently without having seen the types.

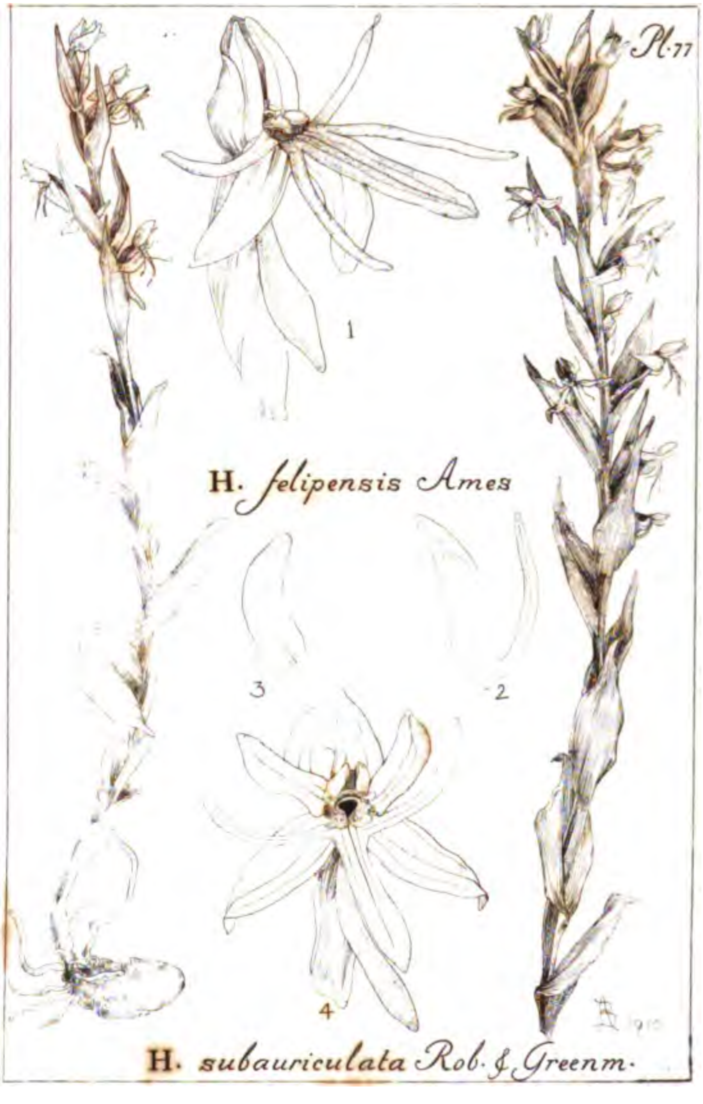
Habenaria guadalajarana is a very distinct species. The type specimen in the Gray Herbarium is about 2.6 dm. tall, with rigid, ovate-lanceolate, appressed leaves. The spurs are distinctly clavate, slightly exceeding 1 cm. in length. I have only seen three collections of this species, four plants in all, which are undoubtedly *H. guadalajarana*. (PLATE 76.)

MEXICO, JALISCO

Guadalajara, August, 1886, *Dr. Edward Palmer* (no. 276 in part) (3) (type).—Rio Blanco, July 17, 1893, *Pringle* (3).—Road between Mesquitec and Monte Escobedo, August 26, 1897, *J. N. Rose* (no. 2611) (2).

H. subauriculata 58. **H. subauriculata** *Rob. & Greenm.*, in Proc. Am. Acad. 32: 34 (1896).

"Glabrous, 5 to 10 inches high: tuberiform root single, ovoid, an inch long: stem flexuous, leafy: leaves ovate, acutish or acute, 3-ribbed, sheathing by the slightly narrowed base, 1 to 1½ inches long, a third or half as broad: spike 2 to 6 inches long, several—many-flowered: bracts ovate-lanceolate, acuminate, about equalling the ovary: flowers green: upper sepals 3-nerved, about 3 lines long, obtusish, the upper broadly ovate, galeate, obtusish,



Pl. 77

H. *felipensis* Ames

H. *subauriculata* Rob. & Greenm.

PLATE 77

Habenaria subauriculata. 3. Petal. 4. Flower. Etched from the type specimen preserved in the Gray Herbarium of Harvard University.

Habenaria felipensis. Plant, natural size, etched from specimens collected by C. G. Pringle in Mexico. 1. Flower, much enlarged. 2. Petal.

Flower and petal drawn, enlarged, with the aid of the camera lucida.

H. subauriculata

3-nerved, 3 lines long; the lateral ones narrowly ovate, obtusish, slightly exceeding the upper one: lateral petals linear-oblong, obtusish, slightly falcate, subauriculate on the lower side at the base, otherwise entire, 2 to 2½ lines long; labellum deeply 3-parted, the divisions linear, the lateral divaricately spreading and slightly curved upwards, 2½ to 3 lines long, about equalling the middle lobe: spur slender, scarcely clavate, green, about 4 lines long.—Collected by C. G. Pringle, on grassy slopes, Las Sedas, Oaxaca, altitude 6000 feet, August, 1894, no. 4830. Habit of *H. flexuosa*, Lindl., and *H. clypeata*, Lindl., but with lateral petals undivided." Rob. & Greenm. *loc. cit.* (PLATE 77.)

MEXICO, OAXACA

Grassy slopes, Las Sedas, 6000 ft., August, 1894, *Pringle* (no. 4830) (2, 3, 4, 5, 7), (type).

H. orizabensis

59. **H. orizabensis** *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 29 (1845).

"102. *H. Orizabensis* Nob. Fol. ovali-acutis; flor. viridibus parvulis, appendice lanceolato, vix sepalo longiori: labello linguæformi angusto, obtuso, basi dilatato." Rich. & Gal. *loc. cit.*

Plant 18 cm. high, with 5 *leaves* along the stem, these elliptic-oblong, abruptly acute, or pointed, 2.5–2.7 cm. long, 1.3 cm. broad. *Flowers* scattered along the loose spike, *bracts* foliaceous, the lower equalling the flowers. *Ovaries* winged. *Dorsal sepal* 7.5 mm., laterals 8.5 mm. long. *Petals* ± 6 mm. long, the anterior divisions equal to the posterior. *Labellum* 9 mm. long. *Spur* ± 9 mm. long. (Flowers are fragmentary on type). (A. A. E.) (PLATE 75.)

MEXICO, VERA CRUZ

Fl. vertes en août, Pic d'Orizaba, 10,000 pd., 1838, *Linden* (no. 184) (21), (type).

60. H. stricta *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 29 (1845). *H. stricta*
Not *Ridl.*, in Journ. Linn. Soc. 21: 510 (1886).

"104. *H. stricta* Nob. Fol. lanceolatis strictis; flor. parvulis viridibus: labello oblongo, obtuso, calcare recurvo brevi." Rich. & Gal. *loc. cit.*

This species has been ignored by later writers. There appears to be no specimen at the Museum of Paris, but there is a drawing of a flower and ovary, petal, gynostemium and lip. From this it appears to be a Euhabenaria with simple lip and petals, and would be related to *H. odontopetala*. (A. A. E.)

The drawing of a flower of *Habenaria stricta* exhibits a species which, as Eaton suggests, appears to be related to *H. odontopetala*. The labellum, however, is ligulate, acute, and probably entire at the base, which is obscured by the elongated, fleshy, stigmatic processes. The petals are not toothed, and as shown in Richard's drawing are lanceolate and 3-nerved. The slender spur is longer than the labellum and subequal to the ovary. (PLATE 78.)

MEXICO

61. H. eustachya *Reichb. f.*, in Ber. Deut. Bot. Gesell. 3: 274 *H. eustachya*
(1885); *Kränzl.*, in Engl. Bot. Jahrb. 16: 183 (1893), Orch. Gen. et Sp. 1: 391 (1898); *Urban*, in Symb. Antill. 4: 163 (1903).—**H. Sanbornii** *Ames*, in Proc. Biol. Soc. Wash. 16: 117, f. 1 (1903), in Smith Enum. Pl. Guat. pt. 7, 51 (1905); *Cogn.*, in Urban Symb. Antill. 6: 306 (1909).

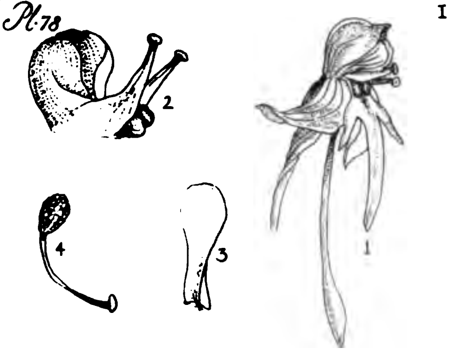
"*Habenaria eustachya:*

"aff. *Habenariæ quadratæ* Lindl., calcari ovario pedicellato breviori, tepalis ligulatis apice bi- seu tridentatis, seu retusis cum apiculo, basi interna angulatis.

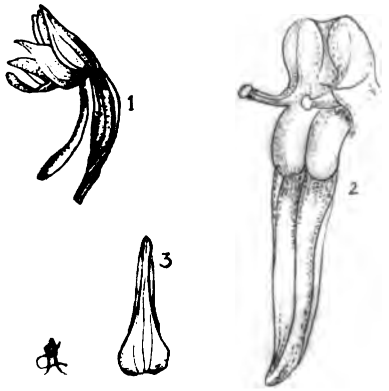
Plate 78

I. *Habenaria virens.* 1. Flower. 2. Column. 3. Petal. 4. Pollen-mass. Etched from a photograph of Richard's drawing.

II. *Habenaria stricta.* 1. Flower. 2. Labellum and column. 3. Petal. Etched from a photograph of Richard's drawing.



HABENARIA
virens
Rich. & Gal.



HABENARIA *stricta*
Rich. & Gal.

"Usque tripedalis. Folia sicca papyracea oblongo-ligulata acuta numerosa, usque ultra pollicem lata, superne decrescentia. Racemus elongatus pedalis dense cylindraceus. Bracteæ triangulæ acuminatæ basi flores æquantes, superne minores. Sepalum impar concavo galeatum ellipticum obtuse acutum. Sepala lateralia triangula lata. Tepala ligulata apice varia (cf. supra), basi angulo obtuso seu acuto versus labellum. Labellum lineari-ligulatum basi latius, nunc utrinque angulatum. Calcar a basi teneriori ampliatum acutum. Canales loculorum antheræ arcuati, varie longi. Crura stigmatica brevia. *H. eustachya*

"Inflorescentia illi *Platantheræ dilatatæ* Lindl. similis.

"Prope Maricao, XI. 1884. Nr. 511 b." Reichb. f. *loc. cit.*

In 1908 I described a Cuban species in the *Proceedings of the Biological Society of Washington*, naming it *H. Sanbornii*. At that time I was unable to obtain satisfactory material of *H. eustachya*, and judged that the specimens described by Reichenbach were different from mine.

H. eustachya is readily distinguished from *H. odontopetala* by its shorter spur and different labellum. In Cuba both species are frequently found growing together on forested slopes, *H. eustachya* blooming later than *H. odontopetala* in Pinar del Rio Province.

H. troyana, Fawcett & Rendle, is a closely allied species from Jamaica.

In my herbarium there are several flowers taken from numbers 511 b and 2880 of the collections made by Sintenis (cf. original description above). These flowers closely resemble the types of *H. Sanbornii* and *H. troyana.*

PORTO RICO

Prope Maricao, Sintenis (no. 511 b), (type!).

H. eustachya CUBA

Cuba orientali, September, 1859–January, 1860, *C. Wright* (no. 1694) (3, 4); 1860–1864, *Wright* (no. 3306) (3).

Pinar del Rio: Cayajabos, November 9, 1902, *O. Ames* (1); shade of hillside trees, January 19, 1903, *Ames & Leavitt* (no. 519) (1, 2, 3), (type of *H. Sanbornii*); January 27, 1903, *Ames & Leavitt* (1); February 28, 1904, *Ames* (1).

MEXICO, Vera Cruz

Orizaba, *Botteri* (3).

Tabasco: *Planta terrestre rara en los borgnes du Atasta*, December, 1889, *J. N. Rovirosa* (16).

GUATEMALA, Alta Verapaz

Cubilquitz, 350 m., January, 1902, *H. von Türckheim*, J. D. Smith distr. (no. 8298).

Reported as follows:

PORTO RICO

Prope Aibonito in sylva primeva ad Barrio del pasto, prope Adjuntas in Monte Cedro locas graminosis, prope Maricao, prope Lares in graminosis montanis ad Palma Llanos et in sylvis primævis ad Guajatuco prope Manati; Sintenis (nos. 511 b (type), 2280, 3995,[1] 6008, 6125, 6907).

H. troyana 62. **H. troyana** *Fawcett & Rendle*, in Journ. Bot. 47: 264 (1909).

"Caulis subrobustus, foliatus. Folia lanceolata, acuta, amplexicaulia, vaginantia, superne bracteiformia. Racemus elongatus, densus. Bracteæ ovato-lanceolatæ, subacuminatæ, foliis superioribus conformes. Pedicelli breves. Sepala reticulato-nervosa; medianum ovato-suborbiculare, obtusissimum, cucullatum; lateralia semi-ovata, obtusa, patentia, mediano longiora. Petala integra, oblonga, retusa, basi obliqua, basim versus quam apice latiuscula et antice lobo obsoleto instructa. Labellum simplex, lineari-ligulatum, basi angulatum; calcare pendulo, leviter curvato, a basi tenui superne robustiore, quam ovarium pedicellatum breviori; processubus stigmaticis brevibus, compressis; antheræ canalibus subæqualibus, leviter curvatis. *H. troyana*

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[1] No. 3995 in herbaria 2 and 3 is represented by *H. monorrhiza* in fruit.

"Plant 6 dm. l. Leaves about 10 cm. l., about 2.5 cm. br. Raceme 3 dm. l. Bracts 3.5–1.2 cm. l., 1.3–.6 cm. br. Sepals, median 6 mm. l., 5 mm. br., lateral 7 mm. l., 3.5 mm. br. Petals 5 mm. l., 2.3 mm. br. Lip 8 mm. l., 1.75 mm. br. near apex, rather over 2 mm. br. near base. Spur 9 mm. l.

"*Hab.*—In damp shady forest; in flower, Nov.; near Troy, 2500 ft., 10,432, *Harris!*

"Differs from *H. Sanbornii* Ames in the smaller, narrower, less membranous leaves, and the larger flowers with clavate, not filiform, spur. *H. Sanbornii* is a larger, coarser-growing plant. Very near *H. eustachya* Reichenb. f. in Ber. Deutsch. Bot. Ges. iii. 274 (1885), from Porto Rico (Sintenis, no. 511*b*), which, however, has the median sepal elliptical and obtusely acute. We have not seen this number of *H. eustachya*, and possibly *H. Sanbornii* may prove to be the same species." Fawcett & Rendle, *loc. cit.*

I have seen flowers of this species submitted for examination by Dr. Rendle. They closely resemble flowers of *H. eustachya* Reichb. f. as represented by Cuban material in my herbarium. The spur is more decidedly inflated and the sepals and petals larger than in the older species. The character of the leaves on which the authors of *H. troyana* lay emphasis in differentiating it from *H. Sanbornii* (which I refer to *H. eustachya*) is of questionable value, as the measurements they give apply in detail to specimens of *H. Sanbornii*. In the Gray Herbarium there is a specimen from Orizaba, Mexico, collected by Botteri, which is intermediate between *H. troyana* and *H. Sanbornii*, and leads to the supposition that *H. troyana* is perhaps only

H. troyana a variety. The Mexican plant has inflated spurs, and slightly larger flowers than the type of *H. Sanbornii.* In the note which accompanies the description of *H. troyana*, *H. Sanbornii* is referred to as a larger, coarser-growing plant. This statement needs modification, as *H. Sanbornii* varies to an extraordinary degree in its dimensions, ranging in height from 3 to 8 dm., with leaves from 8 to 18 cm. long, exclusive of the uppermost ones, which pass gradually into the bracts that subtend the raceme.

In my opinion *H. troyana* is very near *H. eustachya*, and is probably the same species.

H. replicata 63. **H. replicata** *A. Rich.*, in Sagra Fl. Cub. 2: 250, t. 86 (1850);[1] *Griseb.*, Cat. Pl. Cub. 271 (1866); *Sauv.*, Fl. Cub. 283 (1873); *Kränzl.*, in Engl. Bot. Jahrb. 16: 212 (1893), Orch. Gen. et Sp. 1: 434 (1898); *Cogn.*, in Urban Symb. Antill. 6: 308 (1909). Not *H. replicata* Hochst. in Rich. Tent. Fl. Abyss. 2: 296 (1851).

"H. caule erecto gracili sesquipedali: foliis lanceolato-linearibus acutis, basi laxe vaginantibus, brevibus, erectis, cauli appressis; floribus parvulis spicatis; bracteis foliaceis lanceolatis acutis, ovario dimidio brevioribus; ovario elongato apice sensim attenuato et inde rostrato; sepalo supremo convexo, subgaleato, apice obtuso; lateralibus externis dependentibus oblique et inæquilateraliter ovalibus subacutis apice incrassatis; internis (petalis) oblongo-lanceolatis exappendiculatis internæ supremi faciei lateraliter applicatis; labello dependente, sepalorum lateralium longitudine oblongo, angustato, apice incrassato incurvo,

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[1] There is another edition of this work, bearing the date 1853 on the title-page of the volume in which *H. replicata* is described. Richard's *Flora Cubana* composes volumes 10 and 11 of the *Historia Fisica, Politica y Natural de La Isla de Cuba*, by D. Ramon de la Sagra. These volumes are usually cited as 1 and 2. The end of volume 10 (p. 319) closes with "fin del tomo primaro." *H. replicata* is described in volume 11 of the complete work.

supra basin hinc et illinc dente brevi aucto; antherarum cruribus elongatis versus stigma crassissimum replicatis; calcare elongato, gracili ovarium æquante. *H. replicata*

"Crescit in sylvis insulæ Cubæ.

"*Observaciones.* Esta planta entra en la division de las *Rostratæ* de M. Lindley, por su ovario sentado muy adelgazado en el vértice. Pero, todas las especies de HABENARIA citadas por el célebre botánico en la dicha division de su *Genera and Species Orchideous Plants*, son originarias del antiguo continente, y la muestra es distinta, no solo por el conjunto de los detalles de su organisacion, sino por su *habitat.*" Rich. *loc. cit.*

In this species the lateral lobes of the labellum are obtuse and arise from near the middle.

CUBA

"739 to Gr(isebach)," 1860–4, *C. Wright* (3).

PINAR DEL RIO: Herradura, September 21, 1905, *Van Hermann* (no. 939) (1).

64. **H. triptera** *Reichb. f.*, in Linnæa 22: 814 (1849), in Walp. Ann. 3: 588 (1852), in Bonpl. 2: 10 (1854); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 218 (1893), Orch. Gen. et Sp. 1: 445 (1898). *H. triptera*

"**H. triptera** f. lanceolatis acutis strictis in squamas abeuntibus, sp. densiflora brevi, br. oblongis, cuspidatis ovariis longioribus seu æqualibus, ovario trialato, p. ph. supremo ovato, acuto, lateralibus externis lanceolatis acuminatis, p. ph. i. oblongis acutis basi antice angulatis, lb. a basi brevi trifido, partitionibus acutis brevissimis, media producta, lineari, acuta, calcare ovario subæquali.

"Mesochiza in Mexico. Scheide.

"Zacuapan in Mexico. Leibold." Reichb. f. *loc. cit.*

H. triptera MEXICO

Orchis floribus albidus, in pratis pr. Mesochiza, reg.—[?] December 28, *Schiede & Deppe* (19).

H. petalodes **65. H. petalodes** *Lindl.* VAR. **micrantha** *Reichb. f.*, Beitr. Orch. Cent. Am. 5 (1866); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 186 (1893), Orch. Gen. et Sp. 1: 395 (1898) (excl. Warming sp.?); *Cogn.*, in Mart. Fl. Bras. 3, pt. 4, 101 (1893).

"**Habenaria petalodes** Lindl. Gen. Sp. Orch. 316: **var. micrantha.** Rchb. f. ined. Non spithamæa, polyphylla. Folia abbreviata ovata acuta in bracteas abeuntia. Racemus bipollicaris subdensiflorus, floribus porrectis, bracteis semilanceis ovaria pedicellata æquantibus. Sepala oblonga obtuse acuta, tepala flabellata apice retusiuscula cum apiculo in medio, supra basin inferiorem obtusangula, obscure colorata. Labellum lineare. Calcar filiforme ovario pedicellato paulo longius. Rostelli dens liber acuminatus. Crura stigmatica obtuse acuta.

"Valde mirum plantam hucdum tantum in Brasilia (terra de Itacolumi Minas Geraës Martius!) lectam in Panama repertam licet varietate adeo micrantha, ut flores bene duplo sint minores. Panama." Reichb. f. *loc. cit.*

Probably the only collection of this variety. Kränzlin refers Warming's Brazilian specimens here, Cogniaux refers them to the type form.

H. Selerorum **66. H. Selerorum** *Schltr.*, in Bull. Herb. Boiss. 7: 539 (1899).

"Gracilis erecta vel adscendens, c. 40 cm. alta; caule tereti, subflexuoso, pennæ anserinæ crassitudine, foliato, glaberrimo; foliis erecto-patentibus oblongis vel oblongo-ellipticis, glaberrimis, reticulato-venosis, basi vaginantibus usque ad 7 cm. longis,

H. Selerorum

ad apicem caulis versus sensim decrescentibus; racemo oblongo vel cylindrico laxe p[l]urifloro; bracteis ovatis acutis vel acuminatis ovario graciliter pedicellato multo brevioribus; floribus viridi-flavescentibus illis *H. alatæ* Hk. fere æquimagnis; sepalo intermedio suborbiculari obtuso, 0.6 cm. diam., cucullato, sepalis lateralibus deflexis obliquis late oblongis apice breviter acuminatis 0.6 cm. longis, medio fere 0.4 cm. latis; petalis erectis oblongis apice truncato-obtusissimis, carnosulis, basi haud dentatis, 0.5 cm. longis, medio fere 0.2 cm. latis; labello deflexo, lineari obtuso, basi interdum utrinque denticulo minuto donato, 0.8 cm. longo, vix 0.2 cm. lato, carnosulo, calcare filiformi acuto dependente, ovarium bene excedente, c. 8 cm. longo; anthera emarginata, canalibus gracilibus adscendentibus; rostello humili, lobo intermedio triangulari obtusiusculo carnoso; processibus stigmaticis crassis, clavatis, canalibus antherarum duplo brevioribus, apice cohærentibus; capsula clavata, glabra, pedicellata.

"Habitat in Guatemala, in provincia Alta Vera Paz, ad margines silvarum prope Coban: Sel. n. 2492.—Dec." Schltr. *loc. cit.*

I am indebted to Professor Kränzlin for a sketch of this species. Kränzlin suggests that *H. Selerorum* is very near "*H. monorrhiza*" (*H. alata* of this work), but that a sure determination on this point is impracticable owing to the poor condition of the flowers on the specimen he examined. I have seen no material.

The truncate obtuse petals may prove to be a constant differentiating character when this species is compared with *H. alata*. In general habit, *H. Selerorum* as shown by Kränzlin's sketch very closely resembles *H. alata* Hook., and should be rigidly compared with it.

H. brevilabiata **67. H. brevilabiata** *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 29 (1845).

"*H. brevilabiata* Nob. Fol. lanceolatis; flor. viridibus: labello oblongo-angusto, obtuso." Rich. & Gal. *loc. cit.*

Plants, arising from fleshy tuberoids, about 1.6 dm. tall. *Leaves* lanceolate, acute, 4.5–6.7 cm. long, 1.4–1.7 cm. wide. *Floral bracts* equalling the ovaries, lanceolate, acute, the lowermost one nearly 2 cm. long. *Flowers* 5 or more, comparatively large. *Lateral sepals* elliptic-oblong, rounded at the tip, 3-nerved, 1 cm. long, 4 mm. wide. *Upper sepal* elliptical, concave, about 1 cm. long. *Petals* oblong, obtuse, about 8 mm. long, 2.75 mm. wide. *Labellum* ligulate, obtuse, fleshy, entire, 11 mm. long, 2 mm. wide. *Spur* about twice as long as the labellum, somewhat dilated near the apex, 2 cm. long. *Stigmatic processes* comparatively small.

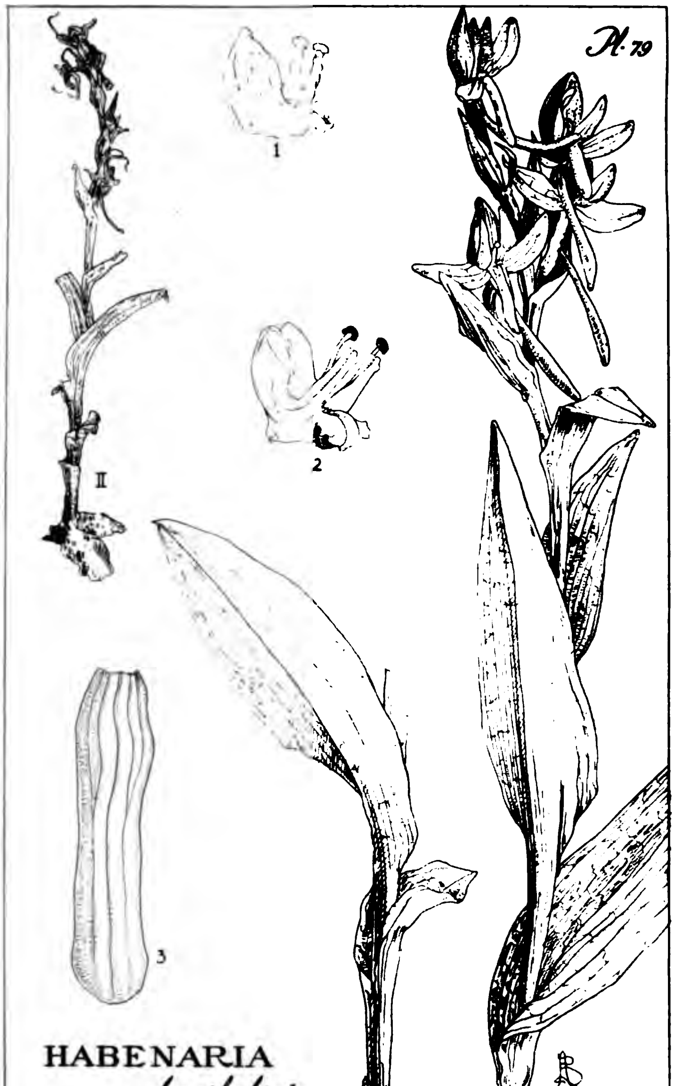
My description is drawn in part from the type and in part from the specimen collected by Pringle in the state of Michoacán. The leaves of the type are broken. The longest one measures 4.5 cm. in length. The spur on the lowermost flower of Galeotti's specimen is 2 cm. long. The two specimens cited below are the only ones of which I have any knowledge. *H. brevilabiata* is apparently a very distinct species, which on account of its simple labellum and petals I refer to the group represented in our range by *H. alata* and its allies.

MEXICO, OAXACA

Fl. verdâtres en sept. Bois humides près la Mer Pacifique, 6500 pd., Cordillera, 1840, *Galeotti* (no. 5037) (21), (type).

MICHOACÁN: On oaks, Tarascon, 6500 ft., October 11, 1904, *C. G. Pringle* (no. 11,911) (1).

H. odontopetala **68. H. odontopetala** *Reichb. f.*, in Linnæa 18: 407 (1844); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Kränzl.*, in Engl. Bot.



HABENARIA
brevilabiata
Rich. & Gal.

ORCHIDACEÆ

PLATE 79. *Habenaria brevilabiata*

I. Plant, natural size, drawn from Pringle's no. 11,911. II. Reduced from a photograph of the type. 1. Column etched from a photograph of Richard's drawing. 2. Column from Pringle's no. 11,911. 3. Labellum from Pringle's no. 11,911.

H. odontopetala

Jahrb. 16: 183 (1893), Orch. Gen. et Sp. 1: 392 (1898); *Ames*, in Proc. Biol. Soc. Wash. 16: 117, f. 2 (1903), Orch. Fl. Fla. 12, t. 2 (1904).—H. Garberi *Porter*, in Bot. Gaz. 5: 135 (1880); *Chapm.*, Fl. S. U. S. ed. 2, 654 (1884); *Small*, in Bull. Torr. Bot. Cl. 27: 275 (1900).

Platanthera Garberi *Chapm.*, Fl. S. U. S. ed. 3, 486 (1897).

Habenaria Michauxii *Kränzl.*, Orch. Gen. et Sp. 1: 396 (1901) in part, not *Nutt.*

Habenella Garberi *Small*, Fl. Se. U. S. 316 (1903).

"*Habenaria* (§2. *Henidia.* a. in Lindl. Gen. et Sp. Orch.) *odontopetala* G. Rchb. fil. foliis lanceolatis acuminatis, racemo multifloro elongato, floribus pedicellatis, pedicellis bracteis lanceolatis acuminatis æqualibus, sepalis oblongis obtuse acutis, petalis paulo minoribus oblongis apice sinuato tridentatis, basi bidentatis, dente inferiore majore, labello lineari apice retuso, calcare filiformi clavato germini pedicellato subæquali, canalibus stigmaticis tenuissimis porrectis, processubus stigmaticis parvis obtusis.

"Stengel vielblättrig, 20″ hoch. Blätter in der Mitte etwa 9‴ breit, 3″ lang. Blüthen von der Grösse derer der *Platanthera chlorantha*, gelb, nach der schriftlichen Notiz des Sammlers.—Temperirtes Mexiko. Leibold." Reichb. f. *loc. cit.*

H. odontopetala is readily distinguished from *H. strictissima* by its oblong petals which are characterized by a tooth at the summit and by protuberant anterior basal angles. From *H. eustachya* it is to be separated by its longer spur and different labellum. In Cuba *H. odontopetala* grows on forested slopes. In Florida I have found it on the edges of wooded areas, mostly in shade. There is no adequate reason for upholding *H. Garberi.* It is clearly referable to *H. odontopetala.*

Dr. Small's new genus Habenella is in my estimation unnecessary and is founded on characters which are sectional rather

H. odontopetala

than generic. It is inadvisable to segregate from Habenaria the species characterized by simple petals and lip. The direction of the stigmatic processes on which Dr. Small relies, in part, for the separation of Habenella from Habenaria does not in my opinion have sufficient value for generic distinction.

FLORIDA, St. John County

St. Augustine, *Mary C. Reynolds* (3).

Sumter Co.: September 7, 1893, *Fred L. Lewton* (4).

Brevard Co.: Merritt's Isl., Indian River, March, 1881, *A. H. Curtiss* (3). —Rich woods near Georgiana Landing, Indian River, February, 1889, *Wm. M. Canby* (16).

Manatee Co.: Hammocks and pine woods, Manatee, December, 1877, *Dr. A. P. Garber* (no. 315) (2, 5, 6, 7, 16), (type of *H. Garberi ?*); (no. 238) (3).—Swamps on hammocks, Oneco, November 7, 1901, *R. M. Grey* (1).—Palmetto, November 30, 1901, *S. M. Tracy* (no. 7529) (2, 3, 4).

Lee Co.: May 7, 1903, *J. E. Layne* (1).—In loose mould within and on edge of small hammock, March 9, 1904, *O. Ames* (1).—In a rich hammock, Henderson's Creek, March 18, 1904, *Oakes & Blanche Ames* (1).—Cypress swamp, Deep Lake, March 7, 1905, fruit, *A. A. Eaton* (no. 1306) (1).

Dade Co.: Little River, December 6, 1903, *Eaton* (1).—Cypress swamp, north folk of Miami River, November 17, 1903, *Eaton* (no. 338) (1).—Alapattah, December 28, 1903, *Eaton* (no. 779) (1).—In low hammock, Orange Glade, west of Miami, December 8, 1903, *Eaton* (no. 782) (1).—Woods, Punch-bowl, Miami, December 26, 1903, *Eaton* (no. 739) (7); dry, rather sandy woods, Breckell Hammock, Miami, February 27, 1905, fruit, *Eaton* (no. 1260) (1).—In rotten hole in prostrate tree, three feet from ground, Timb's Hammock, Gossman's, December 21, 1903, *Eaton* (no. 702) (1); Burden's Hammock, Gossman's, December 21, 1903, *Eaton* (1).—Hammock by prairie near Camp Longview, November 10, 1903, *Eaton* (1). —Hammock by everglade, Camp Jackson, December 12, 1903 (no. 554) (1).

CUBA

1860–4, *C. Wright* (3).

Pinar del Rio: On border of palm grove, San Isidro farm, near Cayajabos (1); November, 1902, *O. Ames* (1); in rich woodlands near a river, November 9, 1902, *Ames* (1); rich woods, frequently in open spaces where the

H. odontopetala sun comes in, January 20–February 10, 1903, *Ames & Leavitt* (1); rich calcareous soil in shade of woods, January 26–29, 1903, *Ames & Leavitt* (1); rich soil in shaded woods, January 27, 1903, *Ames & Leavitt* (1).—*Lomas circa de Taco-Taco*, October 28, 1904, *C. F. Baker* (no. 3814) (1).

MEXICO

Mirador, November, 1841, *Liebman* (no. 256) (3).

H. Purdiei 69. **H. Purdiei**, *Fawcett & Rendle*, in Journ. Bot. 47: 263 (1909).

"Type in Herb. Kew. Herba glabra. Caulis erectus, foliatus, vaginis foliorum tectus. Folia lanceolata, tenuia, insigniter reticulato-11–15-nervia, acuta, superne minora atque bracteiformia, basi amplexicaulia et in vaginam tubulosam angustata. Bracteæ lanceolatæ, acuminatæ, ovario pedicellato breviores. Racemus sublaxus, multiflorus, ambitu oblongus. Flores patuli. Sepala reticulato-3-nervia, venis extus prominentibus; medianum suborbiculare, cucullatum, obtusissimum, margine minute denticulato; lateralia ovali-falcata, concava, obtusa. Petala indivisa, oblonga, obtusissima, 2-nervia. Labellum lineari-ligulatum, pendulum margine revoluto, basim versus utrinque dente parvo instructum, sepalis dimidio longius; calcare tenui, compresso, apicem versus angustato, ovario subduplo longiore; processubus stigmaticis apice crassis; antheræ canalibus subduplo longioribus, ascendentibus; antheræ acute cristata (in spec. exam.).

"Plant 4.5 dm. l. Stem about 3 dm. l., 3.5 mm. br. Leaves, blade to 8 cm. l., to 1.9 cm. br. Bracts, lower 1.7 cm. l. Pedicel about 5 mm. l. Ovary 1–1.8 cm. l. Raceme about 12 cm. l. Sepals, median 8.5 mm. l., 7.7 mm. br., lateral about 11 mm. l., nearly 5 mm. br. Spur barely 3 cm. l. Stigmatic processes about 2 mm. l.; anther-canals about 3.3 mm. l.

"*Hab.*—Hollis's Savanna, Clarendon, *Purdie!*

"Differs from *H. obtusa* Lindl., from Brazil and Surinam, in

H. Purdiei

the smaller lanceolate bracts, and in other details." Fawcett & Rendle, *loc. cit.*

I have been unable to examine the type of *H. Purdiei.* From the description it does not appear to be separable from *H. odontopetala.*

H. Oerstedii

70. **H. Oerstedii** *Reichb. f.*, in Bonpl. 3: 218 (1855), Beitr. Orch. Cent. Am. 45 (1866); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 218 (1893), Orch. Gen. et Sp. 1: 445 (1898).

"10. *H. Oerstedii* (*A.* § 2 a.), aff. Habenariæ hexapteræ Lindl.: foliis oblongo lanceolatis acutis decrescentibus, bracteis ovario subæqualibus, calcare falcato ovarii pedicellati dimidium non æquante, tepalis ligulatis supra basin inferiorem angulatis labello ligulato retuso aut basin utrinque angulato. Planta prope tripedalis. Folia infima quinque-sexpollicaria, suprema abbreviata in bracteas decrescentia. Racemus elongatus. Bracteæ lanceolatæ apiculatæ. Flores illis Habenariæ hexapteræ Lindl. æquales. Ovarium exalatum. Sepala oblonga et summum quidem nunc obovatum apiculatum, nunc tamen oblongum obtusum. Sepala lateralia ligulato falcata obtusa. Brachia stigmatica obtusata apice in ligulam teretiusculam tenuem producta. Eine stattliche blattreiche Pflanze mit ziemlich dichter, fast fusslanger Traube. Segovia, Oersted." Reichb. f. *loc. cit.*

NICARAGUA, SEGOVIA

Oersted 1/48. The lower portion of a stem, two or three flowers in a pocket, and a drawing of a flower and column, in Lindley's herbarium. It has not been reported since.

H. virens

71. **H. virens** *Rich. & Gal.*, in Ann. Sci. Nat. ser. 3, 3: 29 (1845).

"105. *H. virens* Nob. Fol. elliptico-oblongis acutis; flor virid-

H. virens ibus numerosissimis, sepalo supremo galeæformi medio cristato, sepalis internis spathulatis: labello lobis lateralibus acutis, intermedio dimidio brevioribus." Rich. & Gal. *loc. cit.*

This very distinct species has been ignored by subsequent writers. There are three sheets and an excellent drawing of a flower with dissections at the Muséum d'Histoire Naturelle de Paris. *H. virens* has exactly the appearance of *H. strictissima*, but the *labellum* and *petals* are very distinctive. The *lateral lobes*, or teeth, of the *lip* are acute and directed forward. The *spur* is peculiarly up-curved in all the specimens. *Dorsal sepal* orbicular, 5 mm. × 5 mm., *lateral sepals* 7 × 5 mm., *petals* rounded, spathulate, 3 mm. long, lip 9 mm. long, linear beyond the side lobes, blunt, usually appearing as if broadened at the tip, because of revolute edges. (PLATE 78.)

MEXICO, OAXACA
1842, *Ghiesbreght* (21), (type).

H. strictissima 72. **H. strictissima** *Reichb. f.*, in Linnæa 18: 407 (1844), 28: 381 (1856); *Hems.*, Biol. Cent. Am. 3: 306 (1884); *Kränzl.*, in Engl. Bot. Jahrb. 16: 184 (1893), Orch. Gen. et Sp. 1: 392 (1898).—**H. pyramidalis** *Lindl.*, in Ann. Nat. Hist. 15: 386 (1845); *Kränzl.*, in Engl. Bot. Jahrb. 16: 185 (1893), Orch. Gen. et Sp. 1: 393 (1898).

"*Habenaria* (§ 2. *Henidia.* a. in Ldl. Gen. et Sp. Orch.) *strictissima* G. Rchb. fil. foliis oblongis acutis arrectis in bracteas decrescentibus, spica densissima elongata, bracteis lanceolatis ovariis subæqualibus, sepalis petalisque minoribus oblongis obtusis, sepalo superiore cum petalis galeato, labello lineari basi bidentato, dentibus divaricatis, calcare filiformi pendulo ovario longiore, canalibus stigmaticis elongatis, processubus stigmaticis brevibus obtusis.

H. strictissima

"Der dicht beblätterte Stengel ist 18″ hoch, die untersten, längsten Blätter 9‴ breit, 8″ lang. Die Aehre ist ausserordentilich reich-und dichtblüthig. Die Blüthen von der Grösse derer der *Platanthera bifolia;* grün, nach Angabe des Sammlers.

"Temperirtes Mexiko. Leibold." Reichb. f. *loc. cit.*

Habenaria strictissima is clearly distinguished from *H. odontopetala* by its rounded petals which are about as broad as long, scarcely toothed at the tip, and obscurely if at all protuberant on the anterior basal corner. The labellum of *H. strictissima* is variable with regard to the basal teeth. These are sometimes pronounced and sometimes almost obsolete. When strongly developed they resemble those of *H. virens.*

MEXICO

Dr. Coulter (no. 1524) (3).—Near Menco, August 23, 1904, *Pringle* (no. 8915) (1, 3).

SINALOA: Cerro Colorado, near Culiacan, November 5, 1904, *T. S. Brandegee* (1).

JALISCO: Bolaños, *Hartweg* (20).

HIDALGO: Rocky mesa, El Salto, September 16, 1903, *Pringle* (7).

MORELOS: Lava beds near Cuernavaca, 5000 ft., September 15, 1896, *Pringle* (no. 7223) (3, 7).

Reported as follows:

Temperate Mexico (Tierra templada), *Leibold* (type).—*Rarissime*, August, 1855, *Schaffner* (no. 207).

73. **H. alata** *Hook.*, Exot. Fl. 3: t. 169 (1826); *Spreng.*, Syst. Veg. 3: 688 (1826); *Steud.*, Nomencl. ed. 2, 1: 716 (1841); *Griseb.*, Fl. Br W. Ind. 644 (1864), Cat. Pl. Cub. 271 (1866); *Sauv.*, Fl. Cub. 233 (1873); *Reichb. f.*, in Ber. Deut. Bot. Gesell. 3: 274 (1885); *Ames*, in Smith Enum. Pl. Guat. pt. 7, 51 (1905). Not *H. alata* Rich. & Gal. in Ann. Sci. Nat. ser. 3, 3: 29 (1845) (= *H. jaliscana* Wats.).

H. alata

H. alata **Orchis foliosa** *Spreng.*, Syst. Veg. 3: 688 (1826); *Steud.*, Nomencl. ed. 2, 2: 228 (1841), not *Sw.*[1]

Habenaria brachyceras *Lindl.*, Gen. & Sp. Orch. 315 (1835), not *Spreng.*—**H. bidentata** *Pœpp.*, Enum. Pl. Cub. mss. ex *Steud.*, Nomencl. ed. 2, 1: 716 (1841).—**H. monorrhiza** *Cogn.*, in Urban Symb. Antill. 6: 307 (1909).

"Habenaria *alata;* tuberibus subsphæricis, labello basi bidentato petalisque duobus interioribus minoribus lanceolatis, tribus exterioribus ovatis subpatulis, germine alato, cornu lineari-compresso germine breviore.

"*Root* fibrous, and having one or two small, nearly spherical tubers. *Stem* 1 to 1½ foot high, erect, leafy. *Leaves* lanceolate, acuminate, carinate, erect, glabrous.

"*Spike* about 4 inches long, consisting of many, rather densely placed flowers, each accompanied with a lanceolato-subulate bractea. *Corolla:* with the petals scarcely patulous, the 3 outer ones ovate, free, the inner smaller, lanceolate; the *lip*, which is never pendent, but at most standing forward, is the same size as the inner petals, lanceolate, and has a tooth on each side at the base, whilst on the under side, it runs down into a curved compressed horn, nearly as long as the germen. *Column* very short, thick, projecting forward, and with two tuberculated processes. *Anther*, with the two cells distinct, their bases elongated, so as to reach the tuberculated processes: *Pollen-masses* oval, upon a very long, green, filiform, elastic stalk, having a round gland at the base. *Germen* oblongo-clavate, slightly twisted, furrowed; the six angles of the furrows extended into as many longitudinal winged processes." Hook. *loc. cit.*

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[1] Sprengel (*loc. cit.*), and after him Steudel, supposed *Orchis foliosa* Sw. was incorrectly ascribed to Africa and identified it incorrectly with *Habenaria alata* Hook. The Swartzian species is now *H. foliosa* Lindl. from Cape of Good Hope. Correvon (*Orch. Rust.* 140) refers *O. foliosa* Soland. to *H. alata* Hort.

H. alata

My Cuban collections of this species were made in grasslands near the Sierra de los Orgaños Mountains in Pinar del Rio Province. In February the specimens were maturing their fruit and the perianth was partly withered. The specimens gathered by Pringle in Mexico were found on grassy hillsides. It would seem that *H. alata* prefers sunny locations in the open country, and grows mostly in savannas.

In Lindley's herbarium at Kew under *H. brachyceras* two specimens are preserved which I have referred to *H. alata*. One of these, which is very similar to Pringle's no. 3897 in the Gray Herbarium, is marked "Jamaica, Purdie. R. 27." It has the characteristic ovary of *H. alata*, and linear-lanceolate leaves. The other specimen was collected by Hooker in Jamaica and is accompanied by a note which refers it to *H. alata* Hook.

MEXICO, San Luis Potosi

Grassy hillside, Las Canoas, August 29, 1891, *C. G. Pringle* (no. 3897) (3, 4, 7).

Vera Cruz: 4000 ft., *Linden* (21).

GUATEMALA, Santa Rosa

San Juan Utapa, alt. 1100 m., September, 1893, *Heyde & Lux*, J. D. Smith distr. (no. 6247). (Smith, Enum. *loc. cit.*, gives this number as from Cerro Redondo, 1200 m., September, 1892.)

COSTA RICA, Cartago

Cartago, alt. 1300 m., December, 1887, *Juan J. Cooper*, J. D. Smith distr. (no. 5971).

CUBA, Pinar del Rio

In a field, Cayajabos, November 9, 1902, *Ames* (1, 3); upland fields in full sunlight, January 20 to February 10, 1903, *Ames & R. G. Leavitt* (1, 3); open fields, in fruit, February 28, 1904, *Ames* (1).—On a plantation six miles west of Artemisa, in tall grass, red soil, common, February 26, 1904, *Ames*(1).—Santa Catalina, October 18, 1905, *Van Hermann* (no. 3281)(1).

JAMAICA

Purdie (3, 20); *Hooker* (Hb. Lindl. "*H. brachyceras*").

H. alata VENEZUELA

Prope coloniam Tovar, 1854–5, *A. Fendler* (no. 1417) (3), (*H. brachyceras*, fide Lindl.).

BOLIVIA

Yungas, 1890, *A. Miguel Bang* (no. 582) (3).

Reported as follows:

CUBA, *Wright* (nos. 1694, 3306); PORTO RICO, ST. THOMAS, JAMAICA, ANTIGUA, ST. VINCENT

H. socialis 74. **H. socialis** *Fawcett & Rendle*, in Journ. Bot. 47: 263 (1909). "Type in Herb. Kew. Herba glabra. Caulis erectus, foliatus, vaginis foliorum tectus. Folia lanceolata, tenuia, 9-nervia, acuta, superne minora atque bracteiformia, basi amplexicaulia et in vaginam tubulosam angustata. Bracteæ lanceolatæ, acuminatæ, ovario pedicellato subæquilongæ. Racemus sublaxus, multiflorus. Flores erecti. Sepala, medianum enerve, suborbiculare, obtusissimum, apiculatum, cucullatum; lateralia 2-nervia, oblonga, retusa. Petala indivisa, reticulato-2-nervia, oblonga, basim versus antice lobo prominenti instructa apice emarginato, nervibus excurrentibus mucronata. Labellum simplex, lineari-ligulatum, basim angustum versus utrinque lobo prominenti instructum, margine revoluto; calcare tenui, compresso, apicem versus angustato, ovario subæquilongo; processubus stigmaticis, brevissimis, capitatis, glandulosis; antheræ canalibus ascendentibus, processubus duplo longioribus.

"Plant 3 dm. l. Stem about 2 dm. l., 3 mm. br. Leaves, blade to 3.5 cm. l., to 2 cm. br. Bracts, lower 1.3 cm. l. Pedicel about 3 mm. l. Ovary about 1 cm. l. Raceme about 10 cm. l. Flowers green. Sepals, median about 3.5 mm. l. and br.; lateral about 4.3 mm. l., about 2 mm. br. Petals 3.5 mm. l., about 1 mm. br. Lip about 5.5 mm. l., about 1.2 mm. br. Spur about 1 cm. l.

"*Hab.*—Growing with *H. alata* Hook. in marshy soil, near Mandeville, *Purdie!*

H. socialis

"Differs from *H. alata* Hook. in the texture and venation of the leaves, in the flowers being about half the size, in the form of the sepals and petals, and in the relatively longer lip. Differs from *H. quadrata* Lindl. in form of petals, length of spur, and other details." Fawcett & Rendle, *loc. cit.*

75. **H. Dussii** *Cogn.*, in Urban Symb. Antill. 6: 307 (1909).

H. Dussii

"Tuberidiis 1–3, obovato-cylindricis; caule gracillimo, sparse plurifoliato; foliis patulis vel erecto-patulis, tenuiter membranaceis, linearibus vel lineari-ligulatis, acuminatis, basi longiuscule vaginantibus; racemo brevi, laxe paucifloro; bracteis lanceolatis, acuminatis, floribus sæpius æquilongis; sepalis tenuiter 5-nervulosis, dorsali ovato-suborbiculari, apice rotundato, cucullato, lateralibus paulo longioribus, patulis, ovato-oblongis, obtusiuscule apiculatis, subfalcatis; petalis anguste linearibus, acuminatis, uninerviis, rectis, sepalo dorsali leviter brevioribus; labello carnosulo, sepalis lateralibus æquilongo, fere usque ad basin tripartito, partitionibus lateralibus patentissimis anguste lineari-subulatis, acutissimis, intermedia satis longiore, triangulari-ligulata, tenuiter trinervulosa, acutiuscula, deflexa; calcare pendulo, recto, anguste conico, acuto, labello breviore; processubus stigmaticis deflexis, brevibus, crassis, obtusis; antheræ canalibus brevibus, ascendentibus.

"Radices fusiformes. Tuberidia 1–3, alba, villosa, 1–2 cm. longa. Caulis erectus, flexuosus, viridis, 25–40 cm. altus, 1½–2 mm. crassus. Folia intense viridia, tenuiter multinervulosa, limbo 7–11 cm. longo et 5–8 mm. lato, vagina 2–4 cm. longa. Racemus 4–9-florus, 5–10 cm. longus. Bracteæ foliaceæ, 1–2 cm.

longæ. Sepala membranacea, dorsale 4 mm. longum et 3–3½ mm. latum, lateralia 4½–5 mm. longa et 2½ mm. lata. Petala erecta, 3–3½ mm. longa, ⅔ mm. lata. Labelli lobus terminalis strictus, tenuiter trinervulosus, 4½–5 mm. longus, basi 1½ mm. latus; lobi laterales vix arcuati, 2½ mm. longi; calcar 4 mm. longum, inferne 1 mm. latum.

"Flores virides. Fl. IX–XII; fr. X.

"Hab. in Guadeloupe in sylvis humidis ad Nez-Cassé: Duss n. 3981." Cogn. *loc. cit.*

I have seen a single flower of this species taken, presumably, from the type specimen in Urban's herbarium and given to me by Professor Cogniaux. This flower shows clearly the affinity of *H. Dussii* with *H. alata*, although the ovarian wings are not so strongly developed as in that species.

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